ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Lindner Group
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-LIN-20250430-IBC1-EN
Issue date	28/10/2025
Valid to	27/10/2030

NORIT dry screed

Lindner Group

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

Lindner Group

Programme holder

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

Declaration number

EPD-LIN-20250430-IBC1-EN

This declaration is based on the product category rules:

Plasterboard, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

28/10/2025

Valid to

27/10/2030

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

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

NORIT dry screed

Owner of the declaration

Lindner Group
Bahnhofstraße 5
94424 Arnstorf
Germany

Declared product / declared unit

1 m² of the NORIT - Average Dry Screed Floor Panel

Scope:

This EPD is an average EPD and pertains to the NORIT Dry Screed, consisted of calcium sulphate panels with a ranging thicknesses of 18 - 25 mm. The floor panels are manufactured in Dettelbach plant (II), Germany and the production data are collected for the year 2023.

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

Steffen Steier,
(Independent verifier)

2. Product

2.1 Product description/Product definition

This EPD covers the NORIT products, including the following product groups:

NORIT-TE 20.
NORIT-TE 25.
NORIT High Deck 18.
NORIT Screed board.
NORIT Screed board.
NORIT TE 25.
NORIT N+F.

The NORIT dry screed is a base layer for floating installation on an insulating layer for the application of floor coverings. The dry screed is made of gypsum, cellulose fibres and water. It is homogeneous, highly resilient, non-combustible.
The prefabricated elements are manufactured mainly in a measure of 1200 mm x 600 mm.
For installation, NORIT dry screed. adhesive is required to bond the individual elements in the profiling at the board joints. This ensures a force-fit connection of the individual gypsum fibreboards after installation. Supply lines are laid on the bare ceiling below.
This Environmental Product Declaration (EPD) is applicable solely to Norit Dry Screed. It does not encompass upper layers or insulation layers beneath these panels within the life cycle assessment.

Photo: NORIT dry screed

For the use and application of the product the respective national provisions at the place of use apply, in Germany for example the building codes of the federal states and the corresponding national specifications.

2.2 Application

NORIT Dry Screed is a high-performance, prefabricated solution made from gypsum and cellulose fibres. This homogeneous material offers exceptional load-bearing capacity, is non-flammable, and is entirely safe from a building biology perspective, promoting a healthy indoor environment. The NORIT prefabricated screed is ideal for both new construction and renovation projects, and is utilised in public buildings such as schools and kindergartens, as well as in offices, department stores, living spaces, and recreation areas, primarily serving as a load distribution layer to support floor coverings in interior construction. Additionally, it can be used as a fire and sound insulation element. It is also suitable for damp rooms in accordance with *DIN 18534 (W0-I, W1-I)* and helps regulate the room climate.

2.3 Technical Data

The technical data of NORIT Dry Screed in thicknesses ranging from 18 mm ,20 mm and 25 mm are shown in the following table.

Structural data

Name	Value	Unit
Gross density	1283	kg/m^3
Bending strength (longitudinal)	< 18mm 5.5 N/mm >18 mm 5 N/mm²	N/mm^2
Modulus of elasticity	approximately 5000	N/mm^2
Thermal conductivity	ca. 0,3	W/(mK)
Calculation value for thermal conductivity	-	W/(mK)
Specific heat capacity	1,1	kJ/kgK
Water vapour diffusion resistance factor	approximately 14	-
Moisture content at 20 °C, 65% humidity	approximately 1%	M.-%
Elongation/Vibration when humidity changes by 30% (20°C) acc. to EN 318	approximately 0.45	mm/m
Swelling (air-dry to water-saturated)	0 - 2	%
Sound absorption (only with reference to the corresponding component design)	-	%

**- = Performance Not Declared

Product harmonized as well in accordance with the CPR as with other legal provisions of the EU]: Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to ***DIN EN 15283-2: 2009***. Performance data of the product, based on the harmonised standards, in accordance with the other provisions for harmonization. Voluntary data: **Document No. LD-008, Dry floor made of gypsum fibre for indoor use, without additional coating or lamination, acc. to regulation (EU) No. 305/2011 (Construction Products Regulation) (not part of CE-marking)**

2.4 Delivery status

NORIT Dry Screed (standard 1200 x 600 mm) is delivered stacked on reusable wooden pallets. The stack height depends on the thickness of the panels and the type of covering applied. The NORIT-TE adhesive is delivered packed in cardboard boxes.

2.5 Base materials/Ancillary materials

Name	Value	Unit
Gypsum fibreboards (gypsum/cellulose fibres)	99.9	%
Assembly adhesive	< 0.5	%
Edge insulating strips	< 0.5	%

1.The product contains substances on the ECHA list of Substances of Very High Concern (SVHC) for authorisation (date 31.03.2021) above 0.1 mass %: no.
2.The product contains other (carcinogenic, mutagenic, reprotoxic) CMR substances of category 1A or 1B, which are not on the candidate list, above 0.1 % weight by weight in at

least one sub-product: no.
3.Biocidal products have been added to this construction product or it has been treated with biocidal products (it is therefore a treated product within the meaning of the Biocidal Products Regulation (EU) No. 528/2012): no
Gypsum fibreboard:
The gypsum fibreboards consists of 90-96% gypsum binder and 4-10% cellulose fibres. The gypsum binder used is gypsum and calcined grinding, milling and sawing dust from our own production. The recycled content of both the gypsum binder and the cellulose is 100% preconsumer
Assembly adhesive:
The NORIT-TE adhesive is a solvent-free, joint-filling and universally applicable one-component polyurethane assembly adhesive. Details on the adhesive can be found in the technical product or safety data sheet.

2.6 Manufacture

The gypsum fibre products are manufactured in 97519 Dettelbach. State-of-the-art production facilities with unique manufacturing processes ensure the highest quality and reliability.
Production and processing of gypsum fibreboards:The two raw materials gypsum and cellulose fibres are mixed and, after adding water, pressed under pressure to form stable boards, dried and then sawn to the required formats. The edge profiling is then milled.
Lindner Group operates a quality management system in accordance with /EN ISO 9001/.

2.7 Environment and health during manufacturing

Gypsum fibreboards are manufactured in plants approved under environmental protection legislation. By using industrially produced gypsum, natural gypsum resources are conserved due to the avoidance of land consumption from the extraction of natural gypsum deposits
A water circulation concept systematically reduces water consumption. The necessary process water can circulate due to sedimentation and cleaning of the solids.Waste that cannot be avoided during production is channelled into recycling processes via specialist disposal companies.
The development and production of gypsum fibre products are always carried out in accordance with the implemented quality and environmental management system ISO 9001 and ISO 14001 as well as the implemented energy management system ISO 50001.
NORIT dry screed products are FSCTM Recycled 100% certified (FSC™ C119815).[AS1]

2.8 Product processing/Installation

The NORIT Dry Screed, delivered to the construction site, form the foundation of a comprehensive flooring system when combined with individual components; for detailed assembly instructions, please consult our Floor Installation Guidelines. To ensure a flawless installation, it is mandatory that only trained personnel undertake the process.
The dry screed is bonded together using a Norit TE adhesive. This enables low-dust processing to be realised. A filter mask (min. FFP1) is recommended in the event of dust formation. Calcium sulphate does not have to be labelled in accordance with EU directives and the Hazardous Substances Ordinance.

Photo: Laying the NORIT dry screed and bonding with the NORIT-TE adhesive

2.9 Packaging

The packaging is selected to minimise waste. The screed elements are stacked on wooden pallets. The top layer of the pallet stack and the edge protection are made of cardboard. The pallet is wrapped in polythene film. The wooden pallets used are available as disposable pallets. The packaging material is easy to separate and can be reused or recycled if necessary. The waste fractions can be collected by type and sent to the regional recycling provider. Residual materials must be disposed of in accordance with the relevant national regulations. In principle, the packaging specifications for all Lindner standard products are defined in packaging data sheets.

2.10 Condition of use

The NORIT Dry Screed flooring is designed with durability and longevity in mind, ensuring it lasts for the entire lifespan of the building. Based on extensive experience, we expect the material to remain stable, with no significant changes or degradation over time. This durability ensures the flooring system retains its performance, safety, and appearance for many years. As a result, building owners and occupants benefit from a reliable, low-maintenance, and sustainable flooring solution.

2.11 Environment and health during use

From an environmental standpoint, proper utilisation of the NORIT Dry Screed is not anticipated to lead to exposure or contamination of air, water, or soil.
If used as intended, no material changes in the composition are to be expected during the utilisation phase
The gypsum fibreboards has been tested by the Institute für Baubiologie Rosenheim GmbH and is recommended for building biology. The NORIT-TE adhesive is solvent-free and free of VOC-containing substances.
Impact relationships between product, environment and health are not known. Possible pollutant contents or emissions outside the tested values are not known. No hazardous substances are released during the utilisation phase.
According to Directive 2010/75/EU (VOC), the value of the NORIT-TE adhesive is 0 %.
When used as intended and in accordance with guidelines, current knowledge indicates that this floor panel system poses no expected health hazards or impairments to users.
Furthermore, our system has been awarded the prestigious Indoor Air Comfort Gold Label), underscoring its commitment to indoor air quality.

2.12 Reference service life

The service life of the dry screed is generally intended as an interior construction for the entire service life of the building. No reference service life was determined in accordance with ISO 15686-1.
According to the BBSR table "Service life of building components for life cycle analysis according to BNB", the service life for dry screeds made of gypsum fibre according to

code no. 352.112 is ≥ 50 years.
The prerequisite for the specified service life is the intended use of the dry screed indoors.

2.13 Extraordinary effects

Fire

The NORIT Dry Screed flooring panel boasts exemplary fire safety standards, courtesy of its fibre-reinforced calcium sulphate panel composition. Notably, these panels have been officially classified as "Non-Flammable" in accordance to *EN 13501-1* and fall into building material class A1.
Furthermore, the system has successfully met the rigorous testing criteria outlined in DIN 4102-2, thereby achieving a commendable Fire Resistance Class rating.

Fire protection

Name	Value
Building material class	A1
Burning droplets	d0
Smoke gas development	s0

Water

Lindner's NORIT Dry Screed flooring system is designed for indoor applications only, with a general recommendation to minimize direct contact with water to ensure optimal performance. While short-term moisture exposure is tolerable, provided the panels are subsequently allowed to dry completely, prolonged water exposure should be avoided as it may compromise the system's technical properties, despite not leaching pollutants into watercourses. Specifically, in very damp or wet conditions, the panels may undergo swelling, and the supporting structures may corrode.
However, the system is suitable for use in damp rooms, accommodating water exposure classes W0-I & W1-I, making it a versatile choice for various indoor environments with controlled moisture levels. Water Resistance
Classification: Not water-resistant; designed for indoor use with minimal water exposure.

Mechanical destruction

Mechanical destruction of the screed layer impairs its function as a load-distributing screed layer. Destroyed surfaces can be replaced and refitted and fastened using screed clips.

2.14 Re-use phase

Direct reuse of the panels immediately after removal is not feasible due to the technical charectrestics of the panel edges, however, treatment or processing followed by further reuse, as well as the utilisation of raw materials after recycling the panels, have been considered as two potential end-of-life (EoL) scenarios.

- Removal / Landfill: Not considered
- Further Use / Recycling: Turning gypsum floor panels into their constituent materials during the recycling process and further reusing gypsum and fibre as raw materials.
- Processing / Further Use: As new floor panels with smaller dimensions

In the recycling scenario, panels are recirculated as raw material into the production process of new panels, thus closing the material loop. This scenario involves shredding gypsum panels for recycling, converting them into gypsum dust and secondary cellulose. In this case, both cellulose fibre and the gypsum dust from shredding can replace or compensate for alpha hemihydrate and secondary cellulose in the raw materials. For this scenario, it is assumed that: 2 % of the gypsum panels are rejected immediately after dismantling in C1. 98 % of the gypsum panels are transported to Dettelbach to undergo the shredding process, of which: 5 % will be rejected before shredding, containing impurities will be sent to landfill. This amount will be recorded under C4 and will never reach the end-of-waste state.
The remaining 95 % of the panels reached the facility(98 % of total), considered materials for recycling (MFR), will undergo an internal shredding process in Dettelbach, recorded under C3.
All relevant processing impacts are taken into account until the shredded panels reach the end-of-waste state, after converting the gypsum panels into gypsum dust and cellulose in C3, which can be reused within the next production process.
All efforts, expenses, and energy associated with shredding will be recorded under C3, and the gained credit for the material will be documented under Module D.

In the reuse scenario, after appropriate treatment, fibre-reinforced plasterboards can be reused as new panels with reduced size. The dismantling process involves carefully cutting the gypsum fibre panels at their original dimensions of 1200 × 600 mm on-site, using a jigsaw that requires electrical energy under C1. Similar to the previous scenario, this process anticipates an initial loss of 2 % during dismantling, followed by an additional 5 % loss after sorting (C2 and C4). The remaining panels will be transported to Dettelbach for recovery, where they will undergo edge treatment for further reuse. During this recovery process, which consumes electrical energy under C3, the edges of the panels will undergo edge treatment process, reducing the dimensions to 1190 × 590 mm. New panels will be designated as components for reuse (CRU). Additionally, some material will be lost as dust during the grinding and milling processes, which will be sent to landfill (C4).
All efforts, expenses, and energy associated with grinding and milling process will be recorded under C3, and the gained credit for the material will be documented under Module D.

2.15 Disposal

Any remnants of floor panels from construction sites or dismantling activities that cannot be recycled should be disposed of in accordance with the European Waste Index codes: /17 08 02/ for materials based on gypsum, except those classified under /17 08 01/.
The first end-of-life (EoL) scenario for NORIT - Dry Screed panel involves:

- In the first scenario landfilling, where all gypsum panels are sent for disposal.
- In the second scenario, recycling, 2% of the gypsum panels rejected are disposed to landfill, in addition to it 5 % of rest panels which reach the facility are also disposed to landfill during sorting, as recycling is not possible.
- In the third scenario, reusing, 2% of the gypsum panels rejected are disposed to landfill, in addition to it 5 % of rest panels which reach the facility are also disposed to landfill during sorting, in addition to it ,a small amount of dust will be produced while treating the edges in C3, and this dust will also be sent for disposal.

2.16 Further information

For additional product information, please visit: www.Lindner-Group.com.

3. LCA: Calculation rules

3.1 Declared Unit

The floor panel has an average panel thickness of 20.26 mm and an average density of 1283.44 kg/m³. Within the product family, the panel thickness ranges from 18 to 25 mm, and the density varies from 1280 - 1291 kg/m³. The declared unit has a weight of 26 kg/m².

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m^2
Grammage	26	kg/m^2
Layer thickness	0.02026	m
Gross density	1283.44	kg/m^3

3.2 System boundary

The life cycle analysis for the NORIT Dry Screed covers the life cycle stages from EPD type b 'cradle to gate with options, modules C1–C4, and module D (A1–A3 + C + D) and additional modules A4 + A5 (A1-A3+A4+A5+C+D)

Specifically, the following processes were included in information module A1–A3 for the production of the NORIT Dry Screed :
Raw material provision (A1)
Transport of raw, auxiliary materials, and consumables to the plant (A2)
Production processes at the plant, including energy costs (electricity, thermal energy), water consumption, production of packaging materials and disposal of residual substances (A3)
Transport from the factory gate to the construction site (A4)
Disposal of packaging materials (A5)
Dismantling of the panels from the building (C1)
Transportation of discarded panels to facilities for processing, recycling, or disposal (C2).Processing waste materials from the deconstruction stage, including preparation for recycling and energy recovery where applicable (C3)
Disposal of waste materials that cannot be reused or recycled, including physical pre-treatment and management of the disposal site for landfilling scenarios (C4)
Reporting on the benefits and loads associated with the reuse, recovery, and recycling of materials beyond the system boundary, including energy recovery from the disposal of materials (D)

3.3 Estimates and assumptions

In the EPD, The GWP for the electricity mix in modules A1–A3 is 0.67 CO_2e/kWh, while the thermal energy mix accounts for 0.223 kg CO_2e/kWh. With the exception of Modules A1 to A3, which describe the manufacturing process and are therefore based on actual foreground data, all other modules are calculated using assumptions, referred to as scenarios.
As menioned before, developed End-of-Life scenarios are as follows:
Base Scenario - Landfilling: Gypsum panels are dismantled and sent directly to a landfill without recycling, remaining as waste and not entering a recovery process.
Scenario 1 - Shredding for Recycling: The panels are shredded for recycling, with some lost to landfill initially. Most are converted into gypsum dust and cellulose for reuse in production, thus conserving resources.
Scenario 2 - Recovery for Reuse: Panels are carefully dismantled and sorted on-site. A small percentage is lost, but the majority is processed for reuse after edge treatments.
Assumptions and calculations regarding the cutting of plasterboards during dismantling are documented in the project background report. The estimated energy required is approximately 0.048 kWh or 0.1726 MJ. When the edges of a gypsum panel are milled, its area is reduced, which in turn leads to a reduction in weight, which is the required input for LCA modelling. The weight loss can be calculated using the area of the panel that has been lost due to milling and the grammage (weight per unit area) of the gypsum panel and has been documented in the project background report.
It is also assumed that all waste incineration plants have an R1 factor greater than 0.6, indicating a high level of efficiency in energy recovery from waste. This assumption is based on statistical data from waste incineration plants in Northern Europe, as detailed in the CEWEP Energy Report II (Status 2007-2010).
Apart from End-of-Life scenarios, for all transportation-related modules—including A2 , the transportation of the raw material, A4 for transport from the production site to the construction site, and C2 for waste processing—the "GLO: LKW-Zug/Sattel-Zug, Euro 6 A-C" process is utilised, assuming a scalable distance of 100 km. This reflects the reality that a significant portion of raw materials and NORIT Dry Screed products are delivered within Germany, covering a substantial delivery radius from Dettelbach, near Würzburg.

3.4 Cut-off criteria

Cut off rules are not applied. Data for the manufacturing process was collected by the life cycle assessor, with the foreground data referencing the year 2023. No mandatory life cycle phases or relevant processes were omitted in the assessment. All known and calculable inputs and outputs were declared, utilising available LCI datasets from the LCA FE databases accessible to the LCA provider.

3.5 Background data

The software system for holistic balancing, GaBi, developed by thinkstep AG, was used to model the life cycle of the product in question (Sphera MLC (fka GaBi) CUP 2023.02). Data required for the upstream chain, where specific details were unavailable, were sourced from the GaBi database: http://www.gabisoftware.com/support/gabi/gabidatabase-2016-lcidocumentation/

3.6 Data quality

The data quality of the life cycle inventory (LCI) used in the life cycle assessment (LCA) is rigorously evaluated to meet the standards outlined in EN 15804+A2 and EN ISO 14044:2006. The data sets align with the current ILCD format, though not all materials could be represented by complete life cycle inventories.

The assessment considers time-related, geographical, and technological coverage, ensuring that primary data gathered from the Dettelbach production facility reflects the latest production conditions as of 2023 and is supplemented by geographically relevant generic data from the GaBi database.

Technological Coverage
The data used in the LCA reflects the specific technologies employed at the Dettelbach production facility. Where specific technology data was unavailable, approximations were made using the closest available

Time-Related Coverage
The primary data collected at the Dettelbach production facility reflects the most recent production conditions, specifically from 2023. This ensures that the data accurately represents the current state of the manufacturing processes. The reference years for the generic data used from the GaBi database are consistent with the time frame of the project, providing a reliable temporal alignment.

Geographical Coverage
The foreground data was collected from the production facilities

in Germany, ensuring that it is geographically relevant. For background data, the GaBi database was chosen because it includes datasets that are geographically specific to Germany and Europe, ensuring that the environmental impacts are accurately represented for the region.

Completeness
All relevant processes, including material and energy flows involved in the production of the floor system, were thoroughly considered in the life cycle assessment. Data were systematically categorized into specific groups: energy, raw materials, water consumption, wastewater, and waste. This categorization also included materials that remain in a closed loop by reusing their waste, such as the incorporation of gypsum dust back into the material itself. This approach ensured a comprehensive capture of all significant inputs and outputs, allowing for a detailed and accurate assessment of the environmental impacts associated with the product's life cycle.

3.7 Period under review
Production data for this assessment were collected from the Lindner plant in Dettelbach, Germany, for 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 Lindner Group's gypsum-based production line manufactures various products, including the declared NORIT Dry Screed panel. Data collection for thermal and electrical energy use, as well as raw material consumption, focuses specifically on the declared product and unit. Since the production processes for panels, are not segmented into distinct subprocesses, all products produced on the same line undergo identical production steps. The only differences between the NORIT Dry Screed panels and other products are related to the panel's density and thickness.

The methodology comprehensively incorporates end-of-life considerations. Specific allocation methods are clearly documented in the project report, ensuring that the reported data accurately reflects the resources consumed for the production of the NORIT Dry Screed panels while maintaining transparency and consistency throughout the evaluation process.

In detail, allocations relevant for calculation must encompass several key areas:

- Allocation of energy, auxiliary, and operating materials used for individual products in a factory.
- Allocation of co-production processes.
- Allocation in the use of recycled and/or secondary raw materials.
- Loads and benefits beyond the system boundary from recycling or energy recovery of packaging materials and production waste.
- Loads and benefits beyond the system boundary from recycling or energy recovery from the end of life of the product.

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 software system for holistic balancing, GaBi, developed by thinkstep AG, was used to model the life cycle of the product in question (Sphera MLC (fka GaBi) CUP 2023.02). Data required for the upstream chain, where specific details were unavailable, were sourced from the GaBi database:

http://www.gabisoftware.com/support/gabi/gabidatabase-2016-lcidocumentation/ 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 were sourced from the GaBi database (see Section 8, References).

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon
The biogenic carbon content quantifies the amount of biogenic carbon present in NORIT-Dry Screed as it leaves the factory gate and in its accompanying packaging. Specifically for NORIT-Dry Screed, the secondary cellulose used in the production of gypsum boards is classified as a biogenic carbon-containing material.

Product:
Amount of secondary cellulose in the product : 1.8862 kg
Biogenic Carbon in Product (Bio_Product): 0.813 kg C

Packaging:
Regarding the packaging, 98.06% of the materials consist of biogenic carbon-containing substances, which include wood and cardboard.
Input of packaging cardboard: 0.0348 kg
Input of packaging wood: 0.3093 kg
Bound carbon in packaging cardboard: 0.0131 kg C
Bound carbon in packaging wood: 0.1000 kg C
Bound carbon in the packaging (Bio_packaging): 0.1131 kg C

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	0.813	kg C
Biogenic carbon content in accompanying packaging	0.1131	kg C

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

Transport to the building site (A4)

Name	Value	Unit
Truck Type	LKW Euro 6 AC, 28-32 t	-
Fuel Type	Diesel Mix	-
Litres of fuel	0.075	kg/m2
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%
Product weight	26	kg

Installation into the building (A5)
The main auxiliary material for the construction of the NORIT Dry Screed Panel on-site is NORIT TE adhesive of 0.018 kg .

Name	Value	Unit
Auxiliary NORIT TE Adhesive	0.018	kg

A reference service life cannot be calculated for this product. A technical service life of around 50 years is assumed according to the BNB.

Reference service life

Name	Value	Unit
Life Span (according to BBSR)	50	a

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type	26	kg
base scn Landfill	26	kg
Sc.1 Landfill	1.794	kg
Sc.1 Recycle	24.206	kg
Sc.2 Landfill	2.393	kg
Sc.2 Reuse	23.607	kg

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

Name	Value	Unit
Credit from material Sc 1- gypsum	22.45	kg
Credit from material Sc 1- fibre	0	kg
Credit from material Sc 2- gypum board	23.607	kg
Electrical Energy Recovery	0.137	MJ
Thermal Energy Recovery	0.265	MJ

5. LCA: Results

The following table contains the LCA results for a declared unit of 1 m² of Norit Dry Screed Floor Panel

The EPD covers three End of Life scenarios :
- Base Scenario: Landfill
- Scenario 1: Recycle
- Scenario 2: Reuse

Base Scenario is represented by C2, C3, C4, D
Scenario 1 is represented by C2/1, C3/1, C4/1, D/1
Scenario 2 is represented by C1, C2/2, C3/2, C4/2 ,D/2

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 NORIT dry screed Panel

Parameter	Unit	A1-A3	A4	A5	C1	C2	C2/1	C2/2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
GWP-total	kg CO_2 eq	5.05E+00	2.2E-01	4.38E-01	2.3E-03	1.09E-01	2.12E-01	1.17E-01	0	3.72E+00	2.77E+00	3.37E+00	2.32E-01	2.84E-01	-3.02E-02	-4.84E+00	-7.49E+00
GWP-fossil	kg CO_2 eq	8.45E+00	2.12E-01	2.3E-02	2.3E-03	1.05E-01	2.05E-01	1.12E-01	0	9.53E-01	4.61E-02	3.85E-01	2.66E-02	2.69E-02	-3.01E-02	-4.82E+00	-7.47E+00
GWP-biogenic	kg CO_2 eq	-3.4E+00	7.17E-03	4.15E-01	0	3.4E-03	6.1E-03	3.68E-03	0	2.77E+00	2.72E+00	2.98E+00	2.05E-01	2.57E-01	-1.34E-04	-1.49E-02	-2.15E-02
GWP-luluc	kg CO_2 eq	2.87E-03	1.36E-03	1.53E-06	2.49E-07	6.69E-04	1.27E-03	6.97E-04	0	3.83E-05	5.01E-06	1.21E-03	8.37E-05	8.48E-05	-1.92E-06	-2.9E-04	-2.49E-03
ODP	kg CFC11 eq	1.12E-11	5.59E-14	2.75E-14	4.24E-14	2.76E-14	5.23E-14	2.88E-14	0	1.67E-12	8.5E-13	9.93E-13	6.85E-14	6.94E-14	-2.27E-13	-1.3E-11	-9.81E-12
AP	mol H^+ eq	8.37E-03	3.05E-04	4.35E-05	4.9E-06	1.5E-04	2.82E-04	1.55E-04	0	7.06E-04	9.84E-05	2.77E-03	1.91E-04	1.94E-04	-3.69E-05	-4.57E-03	-7.41E-03
EP-freshwater	kg P eq	5.13E-06	5.34E-07	9.87E-09	8.56E-09	2.64E-07	5E-07	2.75E-07	0	3.87E-07	1.72E-07	7.86E-07	5.43E-08	5.5E-08	-4.7E-08	-3.67E-06	-4.5E-06
EP-marine	kg N eq	3.13E-03	1.14E-04	1.55E-05	1.17E-06	5.63E-05	1.06E-04	5.8E-05	0	2.69E-04	2.35E-05	7.16E-04	4.94E-05	5E-05	-1.09E-05	-1.74E-03	-2.77E-03
EP-terrestrial	mol N eq	3.44E-02	1.35E-03	1.92E-04	1.23E-05	6.66E-04	1.25E-03	6.86E-04	0	2.95E-03	2.46E-04	7.87E-03	5.43E-04	5.5E-04	-1.17E-04	-1.91E-02	-3.04E-02
POCP	kg NMVOC eq	8.71E-03	2.7E-04	4.08E-05	3.13E-06	1.33E-04	2.51E-04	1.38E-04	0	7.82E-04	6.28E-05	2.16E-03	1.49E-04	1.51E-04	-3.03E-05	-5.03E-03	-7.7E-03
ADPE	kg Sb eq	1.64E-07	1.64E-08	2.33E-10	3.55E-10	8.09E-09	1.54E-08	8.44E-09	0	2.3E-08	7.13E-09	1.81E-08	1.25E-09	1.26E-09	-2.09E-09	-1.33E-07	-1.44E-07
ADPF	MJ	1.3E+02	3.08E+00	6.98E-02	4.83E-02	1.52E+00	2.88E+00	1.58E+00	0	1.62E+01	9.7E-01	5.2E+00	3.59E-01	3.63E-01	-5.53E-01	-7.07E+01	-1.15E+02
WDP	m^3 world eq deprived	1.6E-01	1.19E-03	1.48E-02	5.11E-04	5.87E-04	1.11E-03	6.12E-04	0	2.07E-02	1.03E-02	4.29E-02	2.96E-03	3E-03	-2.75E-03	-1.63E-01	-1.42E-01

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 NORIT dry screed Panel

Parameter	Unit	A1-A3	A4	A5	C1	C2	C2/1	C2/2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
PERE	MJ	-2.88E+01	2.07E-01	5.24E+00	2.89E-02	1.02E-01	1.93E-01	1.06E-01	0	3.03E+01	2.92E+01	3.21E+01	2.22E+00	9.78E-02	-1.55E-01	-6.45E+00	1.6E+01
PERM	MJ	3.89E-01	0	-3.89E-01	0	0	0	0	0	0	0	0	0	0	0	0	-2.27E+01
PERT	MJ	-2.85E+01	2.07E-01	4.85E+00	2.89E-02	1.02E-01	1.93E-01	1.06E-01	0	3.03E+01	2.92E+01	3.21E+01	2.22E+00	9.78E-02	-1.55E-01	-6.45E+00	-6.75E+00
PENRE	MJ	1.3E+02	3.09E+00	3.69E-01	4.83E-02	1.52E+00	2.89E+00	1.59E+00	0	1.62E+01	9.7E-01	5.2E+00	3.59E-01	3.64E-01	-5.53E-01	-7.07E+01	-1.15E+02

PENRM	MJ	1.4E-01	0	4E-01	0	0	0	0	0	0	0	-5.4E-01	-5.4E-01	-5.4E-01	0	0	2.83E-01
PENRT	MJ	1.3E+02	3.09E+00	7.69E-01	4.83E-02	1.52E+00	2.89E+00	1.59E+00	0	1.62E+01	9.7E-01	4.66E+00	-1.81E-01	-1.76E-01	-5.53E-01	-7.07E+01	-1.15E+02
SM	kg	2.04E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	2.2E+01	2.16E+01
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	1.24E-02	1.84E-04	3.49E-04	2.33E-05	9.07E-05	1.72E-04	9.46E-05	0	9.54E-04	4.68E-04	1.31E-03	9.07E-05	9.18E-05	-1.26E-04	-1.15E-02	-1.1E-02

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 NORIT dry screed Panel

Parameter	Unit	A1-A3	A4	A5	C1	C2	C2/1	C2/2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
HWD	kg	2.35E-08	5.21E-12	3.26E-12	-3.78E-12	2.57E-12	4.87E-12	2.68E-12	0	2.39E-09	-7.59E-11	1.13E-10	7.81E-12	7.91E-12	-3.19E-11	-9.99E-09	-2.1E-08
NHWD	kg	2.34E+00	4.62E-04	4.61E-03	3.54E-05	2.28E-04	4.32E-04	2.38E-04	0	1.28E+00	1.27E+00	2.6E+01	1.76E-03	5.45E-01	-2.69E-04	-2.69E-02	-2.11E+00
RWD	kg	4.15E-03	4.06E-06	2.47E-06	7.68E-06	2.01E-06	3.8E-06	2.09E-06	0	3.02E-04	1.54E-04	5.93E-05	4.09E-06	4.15E-06	-4.12E-05	-6.96E-04	-3.76E-03
CRU	kg	0	0	0	0	0	0	0	0	0	2.38E+01	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	2.42E+01	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	1.37E-01	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	2.65E-01	0	0	0	0	0	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 NORIT dry screed Panel

Parameter	Unit	A1-A3	A4	A5	C1	C2	C2/1	C2/2	C3	C3/1	C3/2	C4	C4/1	C4/2	D	D/1	D/2
PM	Disease incidence	2.2E-07	2.5E-09	4.14E-10	4.13E-11	1.23E-09	2.32E-09	1.27E-09	0	6.07E-09	8.29E-10	3.41E-08	2.35E-09	2.38E-09	-3.13E-10	-2.81E-08	-1.9E-07
IR	kBq U235 eq	3.39E-01	4.35E-04	3.51E-04	1.28E-03	2.15E-04	4.07E-04	2.24E-04	0	5E-02	2.57E-02	6.86E-03	4.73E-04	4.79E-04	-6.85E-03	-7.6E-02	-3.1E-01
ETP-fw	CTUe	2.19E+01	2.25E+00	2.26E-02	1.34E-02	1.11E+00	2.11E+00	1.16E+00	0	6.51E-01	2.7E-01	2.81E+00	1.94E-01	1.97E-01	-7.45E-02	-2.72E+01	-1.9E+01
HTP-c	CTUh	1.13E-09	4.49E-11	2E-12	7.11E-13	2.21E-11	4.2E-11	2.31E-11	0	1.37E-10	1.43E-11	4.37E-10	3.01E-11	3.05E-11	-6.05E-12	-9.7E-10	-9.95E-10
HTP-nc	CTUh	4.8E-08	1.88E-09	1.24E-10	1.13E-11	9.28E-10	1.76E-09	9.67E-10	0	4.85E-09	2.27E-10	4.61E-08	3.18E-09	3.22E-09	-1.51E-10	-2.82E-08	-4.24E-08
SQP	SQP	2.48E+01	1.1E+00	1.54E-02	1.9E-02	5.41E-01	1.03E+00	5.64E-01	0	7.65E-01	3.81E-01	1.26E+00	8.71E-02	8.83E-02	-1.02E-01	-4.68E+00	-2.22E+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.

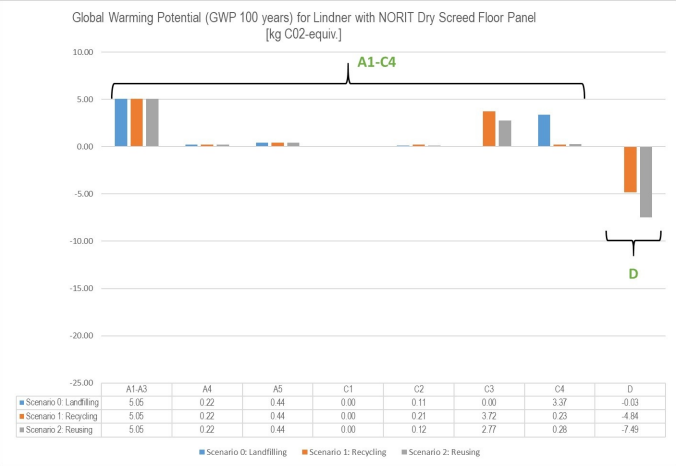
6. LCA: Interpretation

This Environmental Product Declaration (EPD) covers a product family of Norit Dry Screed products, with a declared unit set at 26 kg/m². The analysis shows minimal variations in thickness, density, and weight among the products, ensuring consistent environmental performance. Deviations from the declared unit fall within a narrow range: the lighter variant (23.04 kg/m²) shows an 11.37 % reduction in Global Warming Potential (GWP), recording 4.48 kg CO_2-equivalent for the A1-A3 stages, compared to the declared unit's 5.05 kg CO_2-equivalent. The heavier variant (32.28 kg/m²) exhibits a 24.15 % increase in GWP, at 6.27 kg CO_2-equivalent. These

small differences indicate that, despite differences in weight, both variants perform similarly in terms of environmental impact, ensuring consistent sustainability across the products.

Total Global Warming Potential (GWP)

In all three disposal scenarios, the GWP during the production phase (modules A1-A3) remains the same at 5.05 kg CO_2-equivalent, with emissions from transportation (module A4) at 0.22 kg CO_2-equivalent and from the construction phase (module A5) at 0.44 kg CO_2-equivalent.



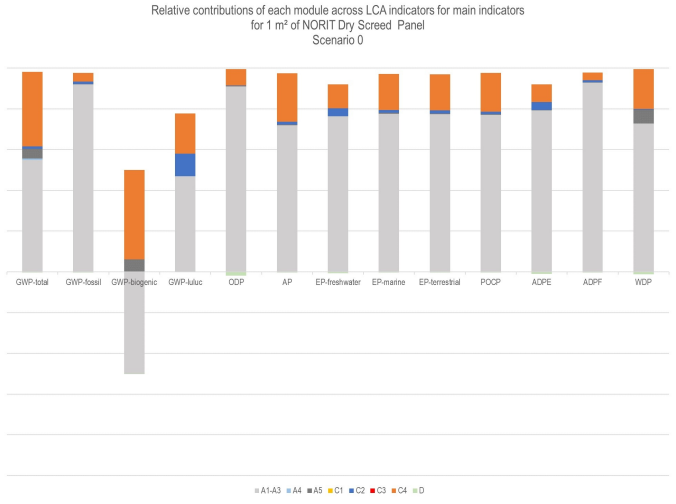
	A1-A3	A4	A5	C1	C2	C3	C4	D
Scenario 0: Landfilling	5.05	0.22	0.44	0.00	0.11	0.00	3.37	-0.03
Scenario 1: Recycling	5.05	0.22	0.44	0.00	0.21	3.72	0.23	-4.84
Scenario 2: Reusing	5.05	0.22	0.44	0.00	0.12	2.77	0.28	-7.49

The manufacturing processes from stages A1 to A5 remain consistent across all scenarios, covering raw material extraction to packaging disposal. Scenario 0 (landfilling) shows an increased GWP in stage C4 due to the release of biogenic carbon during decomposition. Scenario 1 (recycling) results in higher GWP in stages C3/1 and C4/1 due to energy consumption during recycling. Scenario 2 (reusing) shows minimal GWP contributions in C4/2, emphasizing reduced emissions by extending component lifecycle.

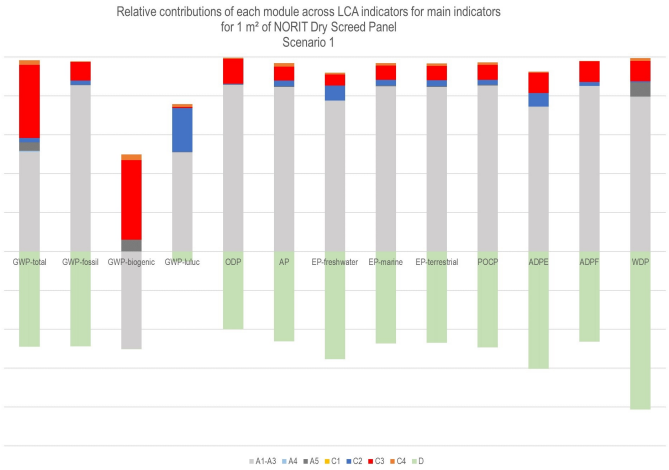
In module D, highlights the environmental benefits of recycling and reusing compared to landfilling. Recycling mitigates GWP by reintroducing materials into production, lowering raw material demand. Reusing offers the most significant GWP reduction, eliminating the need for new product production and minimizing resource consumption.

GWP Fossil & GWP Biogenic

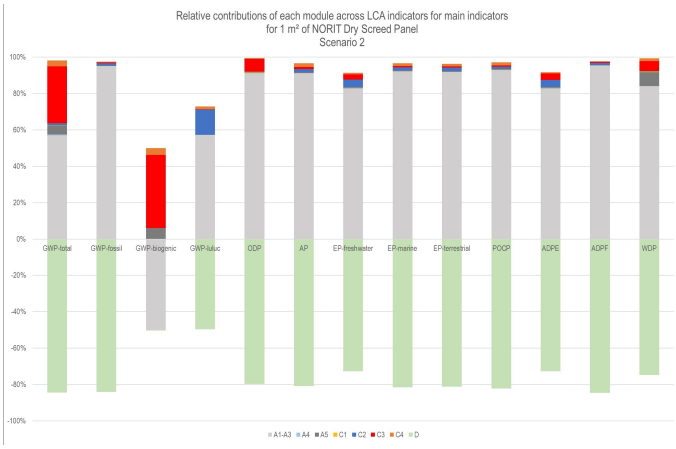
The relative contributions of all other main LCA indicators for 1 m² of NORIT Dry Screed has been shown below for each three scenarios separately.



Scenario 0: The GWP emissions from fossil sources (8.48 kg CO_2e) are more than twice the biogenic GWP, which is a negative value (-3.40 kg CO_2e) due to carbon sequestration from materials. Biogenic carbon release is 6 % in Module A5 and 44 % in C4, attributed to decomposition. Modules C2 and C3 remain stable with minimal emissions. Module C4 results in a 44 % increase in biogenic emissions and a 4 % contribution to total fossil emissions. Module D provides minimal benefits due to landfilling.



Scenario 1: Recycling enhances both fossil and biogenic emission benefits. During production (A1-A3), fossil emissions are 86 %, indicating high energy demand, while biogenic emissions show a -50 % reduction due to effective carbon storage. Recycling reduces GWP fossil emissions compared to Scenario 1. Module C3/1 has a 10 % share in these emissions, while C4/1 shows minimal fossil impact. Module D/1 offers significant environmental benefits with a 49 % decrease in GWP fossil emissions, demonstrating recycling efficacy.



Scenario 2: Reuse drastically reduces both GWP fossil and biogenic emissions. Production (A1-A3) accounts for 95 % of fossil emissions because of intensive energy use. Modules C1 and C3/2 contribute just 1 % to fossil emissions, yet carbon release in C3/2 results in 40 % of biogenic emissions. Module C4/2 impact is minimal. Significant reductions are found in Module D/2, with a 84 % decrease in GWP fossil emissions. This highlights the substantial carbon savings from reuse strategies, greatly lowering the overall carbon footprint.

7. Requisite evidence

7.1 Leaching (sulphate + heavy metals)
The measured values cover key metals of concern, including arsenic, lead, cadmium, chromium, copper, nickel, mercury, and zinc. In the eluate for all metals tested fall significantly below their respective upper limits, indicating compliance with these standards and no significant contamination risks according to *DIN EN 12457-4*. The tested product allows for unrestricted installation concerning arsenic, lead, cadmium, and below-threshold levels for sensitive categories such as chromium, copper, nickel, mercury, and zinc. This compliance is vital for preventing water body contamination when disposed of properly. The data collection also respects TVO (Drinking Water Ordinance) as of 01.01.2008, further reinforcing its environmental safety during various construction and landscaping applications. The IBR report is available with No. 3024 - 1464/ 2024.

7.2 MDI
No MDI adhesive systems are used in the manufacture of this product.

7.3 Testing pretreatment of substances used
The declared product does not contain "recycled wood" in its basic materials. Therefore, there is no basis for testing according to the Recycled Wood Regulation (AltholzVO).

7.4 Toxicity of Combustion Gases
The product is non-flammable, making the assessment of the toxicity of combustion gases irrelevant. A toxicological investigation has been conducted.

7.5 VOC emissions
Test Report No. 3024-1464, dated October 2024, is available for the Norit Dry Screed. The testing was conducted by Institute for Building Biology Rosenheim GmbH.

AgBB overview of results (28 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	25	µg/m³
Sum SVOC (C16 - C22)	<5	µg/m³
R (dimensionless)	0.011	-
VOC without NIK	1	µg/m³
Carcinogenic Substances	1	µg/m³
Formaldehyde	2	µg/m³

AgBB overview of results (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	40	µg/m³
Sum SVOC (C16 - C22)	1	µg/m³
R (dimensionless)	0.025	-
VOC without NIK	1	µg/m³
Carcinogenic Substances	1	µg/m³

8. References

Standards

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

DIN EN 12457-4
DIN EN 12457-4:2002, Characterization of waste — Leaching — Compliance test for leaching of granular waste materials and sludges — Part 4: One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 10 mm (without size reduction).

DIN 18534 (W0-I, W1-I)
DIN 18534:2017, Waterproofing of indoor applications — Part 1: Requirements, principles, and execution for waterproofing systems with flexible waterproofing components (W0-I, W1-I denote specific classes of water exposure).

DIN EN 15283-2:2009
DIN EN 15283-2:2009, Gypsum boards with fibrous reinforcement — Definitions, requirements and test methods — Part 2: Gypsum fibre boards.

Further References

LCA software GaBi
Sphera's LCA for Experts (GaBi) 10.7.1.28

LCA database
Sphera's LCA for Experts (GaBi) database 2023

IBU 2021
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., 2021
www.ibu-epd.com

PCR part A
Calculation Rules for the Life Cycle Assessment andRequirements on the Project Report according to EN15804+A2:2019 /IBU PART A/. Version 1.4.

PCR part B
PCR Guidance-Texts for Building-Related Products and Services From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU)- Requirements on the EPD for Plasterboard, v11, Lastamended: 01.08.2024.

AgBB 2021
Procedure for the health-related evaluation of emissions of volatile organic compounds from construction products.

BBSR
Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR): Service life of construction components. Service life of construction components for Life Cycle Assessments according to the assessment system for sustainable construction (BNB), in: Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (ed.), 2017.

Biocidal Products Regulation

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.

European Chemicals Agency (ECHA)
ECHA, guidance and compliance materials - ensure the safe use of chemicals - scientific and technical advice on EU chemical policies www.echa.europa.eu

CMR substances
European Chemicals Agency (ECHA): Substances of Very High Concern (SVHC) under REACH – Carcinogenic, Mutagenic or Toxic for Reproduction (CMR), Categories 1A and 1B; Candidate List of Substances of Very High Concern for Authorisation, updated 2020.

European Waste Index
Systematic efforts within the European Union to track and categorize waste generation and management practices across member states. This involves collecting data on waste types, quantities, disposal methods, and recycling rates to promote sustainable waste management and ensure compliance with EU environmental regulations

REGULATION (EU) No. 305/2011
(EU) No. 305/2011, Regulation 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 (Construction Products Regulation).

CEWEP Energy Report III (Status 2007-2010)
https://www.cewep.eu/wp-content/uploads/2017/10/1069_13_01_15_cewep_energy_report_iii.pdf aufgerufen am 06.05.24, CEWEP Energy Report III, (Status 2007-2010), Results of Specific Data for Energy, R1 Plant Efficiency Factor and NCV of 314 European Waste-to-Energy (WtE) Plants
DIN EN 12457-4

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