ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Spenner GmbH & Co. KG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SPN-20260080-IBA1-EN
Issue date	24/02/2026
Valid to	23/02/2031

CEM II/B-S 52,5 N (na) - Factory Erwitte

Spenner GmbH & Co. KG

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

Spenner GmbH & Co. KG

Programme holder

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

Declaration number

EPD-SPN-20260080-IBA1-EN

This declaration is based on the product category rules:

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

Issue date

24/02/2026

Valid to

23/02/2031

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

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

CEM II/B-S 52,5 N (na) - Factory Erwitte

Owner of the declaration

Spenner GmbH & Co. KG
Bahnhofstraße 20, , 20
59597 Erwitte
Germany

Declared product / declared unit

1 ton of cement.

Scope:

Product produced at Spenner factory in Erwitte.

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

Mr Stephen Forson ,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Cement is a hydraulic binding material with specific properties and is produced by grinding or blending clinker, gypsum and other materials like limestone.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration DIN EN 197-1 and the CE-marking.

For the application and use the respective national provisions apply.

2.2 Application

Cement is mainly used for concrete, mortar and cement screed production.

2.3 Technical Data

The standard compressive strengths of the cement produced correspond to classification according to EN 197-1 as is shown below.

Constructional data

Name	Value	Unit
Strength class acc. to EN 197-1	52.5	N/mm^2

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to EN 197-1, Composition specification and conformity criteria for common cements.

2.4 Delivery status

Cement is delivered as bulk material and in example transported with trucks and stored in silos.

2.5 Base materials/Ancillary materials

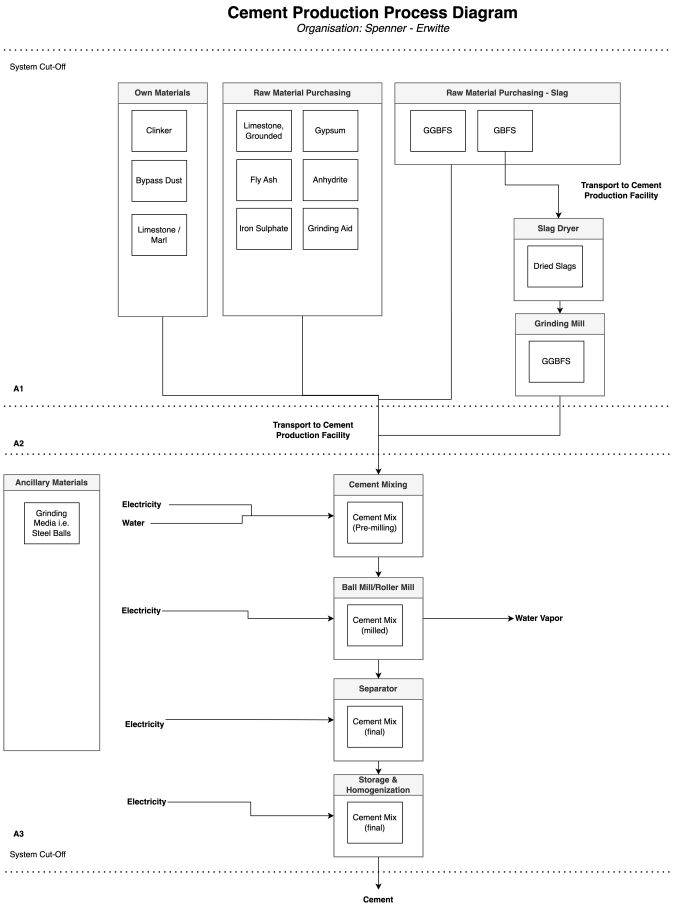
The table below gives an indication of the material composition of the product declared, but, for privacy reasons, is not 100% accurate with the factual composition. Therefore, information supplied serves an indicative purpose.

Name	Value	Unit
Clinker	65-75	%
Blast Furnace Slag	20-30	%
Anhydrite	<5	%
Limestone	<5	%
Gypsum	<5	%
Iron Sulphate	<5	%
Bypass Dust	<5	%

This product does not contain substances listed in the candidate list (date: 20.11.2020) exceeding 0.1 percentage by mass.

2.6 Manufacture

Raw materials are added to the clinker in the cement mixer to create cement products. In specific, materials such as anhydrite, gypsum and iron sulphite are used. Cement materials are stored in silos after production.



2.7 Environment and health during manufacturing

The construction and operation of a cement plant is subject to approval according to the Bundesimmissionsschutzgesetz.

Materials are processed in compliance with relevant safety and environmental data referenced in laws and ordinances.

The production site has established certified management systems to ensure high standard of production, regards to quality management (ISO 9001), energy management (ISO 50001), environmental management (ISO 14001) and occupational health and safety (ISO 45001).

2.8 Product processing/Installation

Machinery used is shown in image in 2.6. Cement is produced by mixing materials and grinding these materials to a specific particle size using stainless steel grinding media.

2.9 Packaging

Bulk cement is declared, therefore no specific packaging applies. Materials are stored temporarily in silo's before and after transportation.

2.10 Condition of use

This section is irrelevant for this specific product.

2.11 Environment and health during use

This section is irrelevant for this specific product.

2.12 Reference service life

This section is irrelevant for this specific product as product declared is a half fabricate used in the production of other products.

In this context, nothing can be stated on the ageing of the product.

2.13 Extraordinary effects

Fire

The product is neither flammable nor explosive. Therefore it is classified as Class A1 according to EN 13501-1.

Fire protection

Name	Value
Building material class	A1
Burning droplets	d0
Smoke gas development	s1

Water

In case cement is brought into contact with water, a hydraulic reaction is initiated. In result, the cement binder paste wil solidify into a hard brick.

The accidental release of large quantities of cement binder into water bodies can cause an increase in the pH value. Water hazard class: WGK1 (slightly hazardous to water) (self-classification according to the Administrative Regulation on Substances Hazardous to Water (VwVwS)).

Mechanical destruction

This section is irrelevant for this specific product.

2.14 Re-use phase

This section is irrelevant for this specific product.

2.15 Disposal

In case the product is to be disposed off, without it getting applied in products such as concrete, mortar or cement screed, it should get cured with water. In result, after curing, the produced brick will be similar to concrete. Waste is to be treated as concrete waste.

EURAL code(s):
17 01 01 - concrete, stones and ceramic products.
10 13 14 - concrete waste and concrete sludge.

2.16 Further information

For more information see: https://spenner-zement.de/en/products/cement/

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 ton of cement.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	t
Gross density	1000	kg/m^3

1 ton of cement is equal to 1000 metric kilograms.

3.2 System boundary

Type of EPD: cradle to gate (A1-A3).
The following material inputs/outputs and processes were considered per module.

A1 - Raw material inputs such as clinker, limestone, gypsum.
A2 - Transportation of materials from supplier to Spenner.
A3 - Ancillary materials such as grinding media.
A3 - Electricity use.
A3 - Fuel use.
A3 - Water use.
A3 - Production loss (wastewater and water evaporation to air).

3.3 Estimates and assumptions

As stated by Spenner, at least EURO4 transport is required to get into environmental zones of Duisburg and Berlin. Therefore, it is assumed that all transport from suppliers to Spenner production locations is at least EURO 4 classification.

3.4 Cut-off criteria

Input and output flows were inventoried using a mass balance. With this methodology, an accuracy of a minimum of 99% was achieved. Mass balance was closed up to 100% using assumptions based on EcoInvent datasets. In result, no mass flows have been cut-off.

Additionally, all production specific energy inputs were considered.

3.5 Background data

Background lifecycle inventory database of EcoInvent was used, version 3.9.1.

3.6 Data quality

Specifically inventoried data is of 2023 and is still representative as of date of publishing of the EPD as no noteworthy changes have been made to the production process of Spenner cements.

Data quality of the LCA-model has been assessed based on EN15804+A2 and is performed in accordance with ISO14040:2006. Quality assessment was based on the system defined in EN15804+A2 - Table E.1.

Overall verdict of data quality is:
Geographical representativeness - Good to Very Good
Technological representativeness - Good to Very Good
Time-related representativeness - Very Good

3.7 Period under review

Data from January 1 to December 31, 2023, were used for the life cycle assessment.

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: Germany

3.9 Allocation

Output Flows:

During clinker production in Erwitte, bypass dust is created. However, as this material is only used within Spenner cement products and economic value of bypass dust is nihil, the choice was made to fully allocate the environmental impact of the clinker production on the clinker itself.

No co-products are produced during the production of cement and therefore no co-product allocation has been done.

Input Flows - Granulated Blast Furnace Slag:

In the Dutch PCR for cement, using economic allocation, and sources from CEM Bureau, it was determined that 1% allocation is to be done on granulated blast furnace slag as a co-product of steel production (pig iron). See Appendix C of NL PCR Cement Source. This allocation was used in this LCA

study and elaborated upon in the LCA background report.

Input Flows - Fly Ash:
In the Dutch PCR for cement, using economic allocation, and sources from EcoInvent, it was determined that 0,7349% of impact from Electricity, High Voltage shall be allocated on Fly Ash. See source NL PCR Cement, Page 15. This allocation was used in this LCA study and elaborated upon in the LCA background report.

Source:
https://milieudatabase.nl/media/filer_public/74/48/7448431d-10d8-4856-9701-057f3f4bb474/nl-pcr_cement_en_grondstoffen_voor_cementproductie_v10.pdf

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. For the modelling of the life cycle inventory, the Ecoinvent 3.9.1 background database was used.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon
This product does not contain biogenic carbon in its product and/or packaging.

Biogenic carbon content at factory gate

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

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

5. LCA: Results

For electricity use, only the residual mix of Germany has been used at medium voltage. This corresponds with the ecoinvent dataset of 'Electricity, medium voltage {DE}| electricity, medium voltage, residual mix | Cut-off, U'.

The GWP for the electricity mix used is:
EN15804+A2 -> GWP-total = 0,691 kg CO2 eq/kWh

The table below showcases the LCA results of the declared product.

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	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 ton CEM II/B-S 52,5 N (na)

Parameter	Unit	A1-A3
Global Warming Potential total (GWP-total)	kg CO_2 eq	5.96E+02
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	5.95E+02
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	3.59E-01
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	2.66E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	2.23E-06
Acidification potential of land and water (AP)	mol H^+ eq	7E-01
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	1.52E-02
Eutrophication potential aquatic marine (EP-marine)	kg N eq	2.21E-01
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	2.79E+00
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	8.09E-01
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	1.04E-04
Abiotic depletion potential for fossil resources (ADPF)	MJ	2.25E+03
Water use (WDP)	m^3 world eq deprived	2.11E+01

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 ton CEM II/B-S 52,5 N (na)

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier (PERE)	MJ	3.28E+01
Renewable primary energy resources as material utilization (PERM)	MJ	0
Total use of renewable primary energy resources (PERT)	MJ	3.28E+01
Non renewable primary energy as energy carrier (PENRE)	MJ	2.25E+03
Non renewable primary energy as material utilization (PENRM)	MJ	0
Total use of non renewable primary energy resources (PENRT)	MJ	2.25E+03
Use of secondary material (SM)	kg	1.13E+01
Use of renewable secondary fuels (RSF)	MJ	2.93E+02
Use of non renewable secondary fuels (NRSF)	MJ	9.65E+02
Use of net fresh water (FW)	m^3	1.39E+00

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 ton CEM II/B-S 52,5 N (na)

Parameter	Unit	A1-A3
Hazardous waste disposed (HWD)	kg	5.46E-03
Non hazardous waste disposed (NHWD)	kg	1.2E+01
Radioactive waste disposed (RWD)	kg	5.26E-03
Components for re-use (CRU)	kg	0
Materials for recycling (MFR)	kg	0
Materials for energy recovery (MER)	kg	0
Exported electrical energy (EEE)	MJ	0
Exported thermal energy (EET)	MJ	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 ton CEM II/B-S 52,5 N (na)

Parameter	Unit	A1-A3

Incidence of disease due to PM emissions (PM)	Disease incidence	5.12E-06
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	4.11E+00
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	5.08E+02
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	1.26E-07
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	2.61E-06
Soil quality index (SQP)	SQP	1.94E+02

For all GWP indicators in A1-A3 net values are reported. The waste status of all (waste-based) fuels has been proven. Gross emissions (i.e. including CO2 from combustion of proven wastes) are:
Net GWP-total **+104,85** kg CO2-Eq./t (GWP-total),
Net GWP-fossil **+80,54** kg CO2-Eq./t (GWP-fossil),
Net GWP-biogenic **+24,31** kg CO2-Eq./t (GWP-biogenic)

Values supplied are the corresponding sums of net emissions and emissions from combustion of proven wastes.

Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

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

6. LCA: Interpretation

The majority of impact from CO2 emisssions is created due to clinker use. As more clinker gets replaced by slag, so does also shift the impact contribution from clinker to slag. Slag is however less GWP-total intensive. The dominant module where GWP-total impact is generated is therefore A1.

7. Requisite evidence

The following describes evidence of radioactivity and chromate.

Cement is not a radioactive material. Since cements (according to the European Regulation (EC) 1907/2006 "REACH Regulation" and the Prohibition of Chemicals Ordinance) with too high water-soluble chromate content may not be placed on the market, (if the risk of skin contact exists) this cement does not have too high water-soluble chromate content.

8. References

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CEN. (2019). EN 13501-6 - Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests. CEN.

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