

Environmental Product Declaration

according to ISO 14025 and EN 15804



This declaration is for:

**Ground Granulated Blastfurnace Slag
(GGBS)**

Provided by:

ECOCCEM France SAS



program operator

Stichting MRPI®

publisher

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www.mrpi.nl

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MRPI® REGISTRATION

1.1.00481.2023

DATE OF ISSUE

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SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by **Niels Jonkers, PLUK sustainability**.

The LCA study has been done by **Stijn Mulder, EcoReview**.

The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A2. It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs of construction products may not be comparable if they do not comply with EN15804+A2. Declaration of SVHC that are listed on the 'Candidate List of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

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ir. J-P den Hollander, Managing director MRPI®

PRODUCT

Ground Granulated Blastfurnace Slag (GGBS)

DECLARED UNIT/FUNCTIONAL UNIT

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DESCRIPTION OF PRODUCT

Ground granulated blastfurnace slag (GGBS), is a latent hydraulic material and is normally used in combination with Portland cement or other types of activators.

VISUAL PRODUCT



MORE INFORMATION

www.ecocemglobal.com/fr

DEMONSTRATION OF VERIFICATION

CEN standard EN15804 serves as the core PCR[a]

Independent verification of the declaration and data,

according to EN ISO 14025:2010:

internal: external: X

Third party verifier:

Niels Jonkers, PLUK sustainability

[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

Ecocem ggbs is a (latent) hydraulic binder made by finely grinding granulated blastfurnace slag (GGBS). Ecocem ggbs is an “intermediate” product, i.e., a constituent to produce concrete, mortars, grouts, coatings and other mixtures intended for construction and the manufacture of construction products.

Ecocem ground granulated slag is manufactured under a fully controlled process, by drying and fine grinding the raw material, granulated slag. This is a secondary material co-produced with pig iron by the blast furnaces.

It is used:

- In concrete mixes as a substitute for cements, as a type II pozzolanic or latent hydraulic additive or as a grain modifier;
- In the mix for cement surface preparations.
- With bentonite for producing special foundations, soil reinforcements, etc.
- As a base for hydraulic binders for roads or for road gravel.
- For treating agricultural materials (hemp, rapeseed, etc.) to improve their resistance to water penetration, mildew, and their reaction to fire.
- In combination with marine sediments.

| COMPONENT > 1% of total mass | [%] |
|------------------------------|------|
| Ground Blastfurnace Slag | 100% |

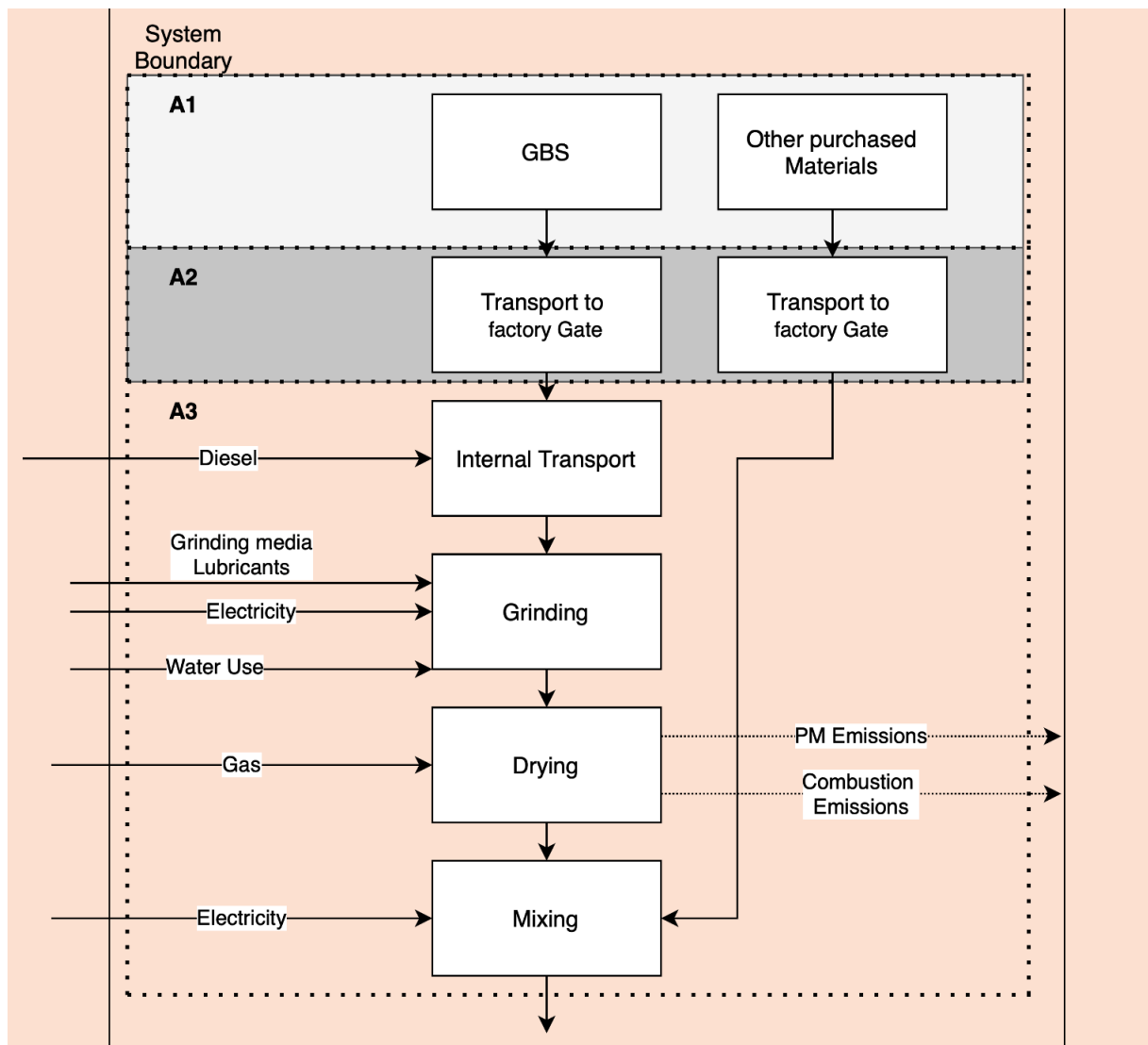
SCOPE AND TYPE

The type of this EPD is Cradle-to-Gate (A1-A3). All major steps from the extraction of natural resources to the factory gate are included in the environmental performance of the manufacturing phase, except those that are not relevant to the environmental performance of the product. The software SimaPro is used to perform the LCA. The background databases used is EcoInvent 3.6

| PRODUCT STAGE | | | CONSTRUCTION | | | | | USE STAGE | | | | | END OF LIFE | | | | BENEFITS AND | |
|---------------------|-----------|---------------|------------------------|----------|-----|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-------------|------------------|----------|------------------------------------|-------------------|--|
| | | | PROCESS | | | | | | | | | | STAGE | | | | LOADS BEYOND THE | |
| | | | STAGE | | | | | | | | | | | | | | SYSTEM BOUNDARIES | |
| Raw material supply | Transport | Manufacturing | Transport gate to 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 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | |

X = Modules Assessed

ND = Not Declared



LCA process diagram according to EN 15804 (7.2.1)

REPRESENTATIVENESS

This EPD is representative for the Ecocem Dunkirk production facility.

ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2)

| | UNIT | A1 | A2 | A3 | A1-A3 |
|-----------------------|-------------------------|----------|----------|---------|---------|
| GWP-total | kg CO2 eq. | 8.59E+1 | 3.15E-1 | 1.94E+1 | 1.06E+2 |
| GWP-fossil | kg CO2 eq. | 8.57E+1 | 3.15E-1 | 1.94E+1 | 1.05E+2 |
| GWP-biogenic | kg CO2 eq. | 1.86E-1 | -2.16E-5 | 8.79E-3 | 1.95E-1 |
| GWP-luluc | kg CO2 eq. | 2.39E-2 | 2.09E-4 | 1.50E-3 | 2.56E-2 |
| ODP | kg CFC11 eq. | 2.17E-13 | 6.65E-8 | 2.90E-6 | 2.96E-6 |
| AP | mol H+ eq. | 1.72E-1 | 6.34E-3 | 2.42E-2 | 2.03E-1 |
| EP-freshwater | kg PO4 eq. | 1.26E-4 | 1.92E-6 | 6.36E-5 | 1.92E-4 |
| EP-marine | kg N eq. | 3.87E-2 | 1.52E-3 | 8.55E-3 | 4.88E-2 |
| EP-terrestrial | mol N eq. | 4.19E-1 | 1.69E-2 | 9.11E-2 | 5.27E-1 |
| POCP | kg NMVOC eq. | 1.53E-1 | 4.51E-3 | 2.60E-2 | 1.84E-1 |
| ADP-minerals & metals | kg Sb eq. | 8.23E-6 | 4.91E-6 | 1.99E-5 | 3.30E-5 |
| ADP-fossil | MJ, net calorific value | 7.41E+2 | 4.33E+0 | 5.38E+2 | 1.28E+3 |
| WDP | m3 world eq. deprived | 4.58E+1 | 1.01E-2 | 3.10E+0 | 4.89E+1 |

GWP-total = Global Warming Potential total

GWP-fossil = Global Warming Potential fossil fuels

GWP-biogenic = Global Warming Potential biogenic

GWP-luluc = Global Warming Potential land use and land use change

ODP = Depletion potential of the stratospheric ozone layer

AP = Acidification Potential, Accumulated Exceedence

EP-freshwater = Eutrophication Potential, fraction of nutrients reaching freshwater end compartment

EP-marine = Eutrophication Potential, fraction of nutrients reaching marine end compartment

EP-terrestrial = Eutrophication Potential, Accumulated Exceedence

POCP = Formation potential of tropospheric ozone photochemical oxidants

ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]

ADP-fossil = Abiotic Depletion for fossil resources potential [2]

WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

Disclaimer [2]

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2)

| | UNIT | A1 | A2 | A3 | A1-A3 |
|--------|-------------------|---------|----------|---------|---------|
| PM | Disease incidence | 1.46E-6 | 1.69E-8 | 3.94E-7 | 1.87E-6 |
| IRP | kBq U235 eq. | 6.58E+0 | 1.87E-2 | 4.51E+0 | 1.11E+1 |
| ETP-fw | CTUe | 2.86E+2 | 3.18E+0 | 9.24E+1 | 3.82E+2 |
| HTP-c | CTUh | 1.33E-7 | 1.81E-10 | 2.72E-9 | 1.36E-7 |
| HTP-nc | CTUh | 1.34E-6 | 3.18E-9 | 3.52E-8 | 1.38E-6 |
| SQP | --- | 7.43E+1 | 1.93E+0 | 7.12E+0 | 8.34E+1 |

PM = Potential incidence of disease due to PM emissions

IRP = Potential Human exposure efficiency relative to U235 [1]

ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]

HTP-c = Potential Comparative Toxic Unit for humans [2]

HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]

SQP = Potential soil quality index [2]

Disclaimer [1]

- 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 nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer [2]

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

RESOURCE USE per functional unit or declared unit (A1 / A2)

| | UNIT | A1 | A2 | A3 | A1-A3 |
|-------|------|---------|---------|---------|---------|
| PERE | MJ | 8.01E+1 | 4.59E-2 | 4.01E+1 | 1.20E+2 |
| PERM | MJ | 0.00 | 0.00 | 0.00 | 0.00 |
| PERT | MJ | 8.01E+1 | 4.59E-2 | 4.01E+1 | 1.20E+2 |
| PENRE | MJ | 7.42E+2 | 4.60E+0 | 5.51E+2 | 1.30E+3 |
| PENRM | MJ | 0.00 | 0.00 | 0.00 | 0.00 |
| PENRT | MJ | 7.42E+2 | 4.60E+0 | 5.51E+2 | 1.30E+3 |
| SM | kg | 0.00 | 0.00 | 0.00 | 0.00 |
| RSF | MJ | 0.00 | 0.00 | 0.00 | 0.00 |
| NRSF | MJ | 0.00 | 0.00 | 0.00 | 0.00 |
| FW | m3 | 1.13E+0 | 3.62E-4 | 3.29E-1 | 1.46E+0 |

PERE = Use of renewable energy excluding renewable primary energy resources

PERM = Use of renewable energy resources used as raw materials

PERT = Total use of renewable primary energy resources

PENRE = Use of non-renewable primary energy resources excluding non-renewable 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 materials

RSF = Use of renewable secondary fuels

NRSF = Use of non renewable secondary fuels

FW = Use of net fresh water

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 / A2)

| | UNIT | A1 | A2 | A3 | A1-A3 |
|------|------|---------|---------|---------|---------|
| HWD | kg | 1.74E-7 | 7.15E-6 | 2.12E-4 | 2.19E-4 |
| NHWD | kg | 4.55E-1 | 1.22E-1 | 6.96E-1 | 1.27E+0 |
| RWD | kg | 3.57E-2 | 2.97E-5 | 5.94E-3 | 4.17E-2 |
| CRU | kg | 0.00 | 0.00 | 0.00 | 0.00 |
| MFR | kg | 0.00 | 0.00 | 0.00 | 0.00 |
| MER | kg | 0.00 | 0.00 | 0.00 | 0.00 |
| EEE | MJ | 0.00 | 0.00 | 0.00 | 0.00 |
| ETE | MJ | 0.00 | 0.00 | 0.00 | 0.00 |

HWD = Hazardous Waste Disposed

RWD = Radioactive Waste Disposed

MFR = Materials for recycling

EEE = Exported Electrical Energy

NHWD = Non Hazardous Waste Disposed

CRU = Components for reuse

MER = Materials for energy recovery

ETE = Exported Thermal Energy

BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 / A2)

| | UNIT | A1 | A2 | A3 | A1-A3 |
|-------|------|------|------|------|-------|
| BCCpr | kg C | 0.00 | 0.00 | 0.00 | 0.00 |
| BCCpa | kg C | 0.00 | 0.00 | 0.00 | 0.00 |

BCCpr = Biogenic carbon content in product

BCCpa = Biogenic carbon content in packaging

CALCULATION RULES

Data quality

Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

Data collection period

The dataset is representative for the production processes used in 2021.

Methodology and reproducibility

The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented. In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated.

Allocation

Allocation of emissions from steel production to the purchased GBS are in accordance with the French regulations mentioned in the NF EN 15804+A2/CN and the economic allocation recommended by the French government (DHUP – Department of Housing, Urban Planning and Landscape).

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

A1. Raw materials supply

This module considers the extraction and processing of GBS. The system boundary of the raw material production is determined between the blast furnace slag production and the quenching process. Emissions from the steel production are allocated onto the blast furnace slag in accordance with the NF EN 15804+A2/CN and the economic allocation recommended by the French government (DHUP – Department of Housing, Urban Planning and Landscape). The impacts related to the quenching of the blast furnace slag are allocated onto the gbs production.

A2. Transport of raw materials to manufacturer

The transportation of the suppliers to Ecocem Dunkirk is done by truck or Ship.

A3. Manufacturing

The production consists of grinding and drying of Granulated Blastfurnace Slag (GBS).

DECLARATION OF SVHC

None of the substances contained in the product are listed in the "Candidate List of Substances of Very High Concern for authorisation", or they do not exceed the threshold with the European Chemicals Agency.

REFERENCES

- Simapro 9.5.0.0.
- EN 15804: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', EN 15804:2019+A2.
- ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.
- ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.
- ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO14025:2006.

REMARKS

None