

Environmental Product Declaration

according to ISO 14025 and EN 15804



This declaration is for:
Eco2cem GGBS

Provided by:
Ecocem Benelux B.V.



program operator

Stichting MRPI®

publisher

Stichting MRPI®

www.mrpi.nl

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Nationale

MilieuDATABASE



COMPANY INFORMATION



Ecocem Benelux B.V.
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PRODUCT

Eco2cem GGBS

DECLARED UNIT/FUNCTIONAL UNIT

The production of 1 metric ton of cement

DESCRIPTION OF PRODUCT

Eco2cem, mainly consisting of ground granulated blastfurnace slag (GGBS), is a latent hydraulic material and is normally used in combination with an activator (such as Portland cement).

VISUAL PRODUCT



MRPI® REGISTRATION

1.1.00235.2021

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 **Ruben van Gaalen, EcoReview B.V.**

The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A2 (incl. A1). 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 (incl. A1). 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.

PROGRAM OPERATOR

Stichting MRPI®
Kingsfordweg 151
1043GR
Amsterdam

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

MORE INFORMATION

www.ecocem.nl

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

Eco2cem is mostly used as cementitious binder in concrete. It has a very low environmental impact, and is used to minimize the embodied CO₂ and embodied energy of cementitious and concrete products. Because its chemistry is different to Portland cement, it imparts additional durability benefits to concrete, such as improved resistance to sulphate attack, acid attack, and chloride migration. It also gives concrete higher long-term strength than that made with ordinary Portland cement. And because of its whitish colour, it gives concrete a lighter, clearer appearance and less efflorescence.

COMPONENT (> 1%)	[kg / %]
Ground Blastfurnace Slag	100%

(*) > 1% of total mass

SCOPE AND TYPE

The type of this EPD is Cradle-to-Gate (A1-A3). Module C1 to C4 and module D are not declared because the materials are no longer identifiable at end of life as a result of the physical or chemical transformation process in the concrete products. 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 EcoChain is used to perform the LCA. The background databases used are:

- Ecoinvent (v3.5)

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					
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				

X = Modules Assessed

ND = Not Declared



Figure: LCA process diagram according to EN 15804 (7.2.1)

REPRESENTATIVENESS

This EPD is representative for products produced and sold in the EU. The Eco2cem GGBS is produced in one production site in Moerdijk, The Netherlands.

ENVIRONMENTAL IMPACT per functional unit or declared unit (indicators A1)

	UNIT	A1	A2	A3	A1-A3
ADPE	kg Sb. eq.	1.19E-5	2.29E-6	6.14E-5	7.56E-5
ADPF	MJ	4.80E+1	7.44E+1	4.51E+2	5.74E+2
GWP	kg CO2 eq.	3.05E+0	5.41E+0	2.54E+1	3.39E+1
ODP	kg CFC 11 eq.	1.74E-7	8.57E-7	3.15E-6	4.18E-6
POCP	kg ethene eq.	2.68E-3	4.32E-3	5.66E-3	1.27E-2
AP	kg SO2 eq.	4.46E-2	6.99E-2	3.42E-2	1.49E-1
EP	kg (PO4)3- eq.	1.92E-3	9.59E-3	6.67E-3	1.82E-2

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB-eq.	1.17E+0	1.75E+0	5.54E+0	8.46E+0
FAETP	kg DCB-eq.	1.08E-1	3.70E-2	6.79E-2	2.13E-1
MAETP	kg DCB-eq.	8.74E+0	1.40E+2	2.11E+2	3.60E+2
TETP	kg DCB-eq.	9.19E-4	6.91E-3	2.10E-1	2.18E-1
ECI	Euro	4.70E-1	8.30E-1	2.05E+0	3.35E+0
ADPF	kg Sb. eq.	2.31E-2	3.58E-2	2.17E-1	2.76E-1

ADPE = Abiotic Depletion Potential for non-fossil resources

ADPF = Abiotic Depletion Potential for fossil resources

GWP = Global Warming Potential

ODP = Depletion potential of the stratospheric ozone layer

POCP = Formation potential of tropospheric ozone photochemical oxidants

AP = Acidification Potential of land and water

EP = Eutrophication Potential

HTP = Human Toxicity Potential

FAETP = Fresh water aquatic ecotoxicity potential

MAETP = Marine aquatic ecotoxicity potential

TETP = Terrestrial ecotoxicity potential

ECI = Environmental Cost Indicator

ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]

ND = Not Declared

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

	UNIT	A1	A2	A3	A1-A3
GWP-total	kg CO2 eq.	2.87E-1	5.49E+0	2.58E+1	3.16E+1
GWP-fossil	kg CO2 eq.	2.85E-1	5.46E+0	2.58E+1	3.15E+1
GWP-biogenic	kg CO2 eq.	1.74E-3	1.79E-2	9.76E-3	2.94E-2
GWP-luluc	kg CO2 eq.	2.48E-4	7.16E-3	2.42E-3	9.83E-3
ODP	kg CFC11 eq.	1.57E-8	1.06E-6	3.59E-6	4.67E-6
AP	mol H+ eq.	1.60E-3	8.95E-2	4.31E-2	1.34E-1
EP-freshwater	kg PO4 eq.	2.83E-5	1.00E-4	8.35E-4	9.63E-4
EP-marine	kg N eq.	2.57E-4	2.52E-2	1.08E-2	3.63E-2
EP-terrestrial	mol N eq.	3.07E-3	2.82E-1	1.21E-1	4.06E-1
POCP	kg NMVOC eq.	1.22E-3	7.28E-2	3.81E-2	1.12E-1
ADP-minerals&metals	kg Sb eq.	3.31E-6	2.28E-6	6.14E-5	6.70E-5
ADP-fossil	MJ, net calorific value	3.21E+0	7.58E+1	4.03E+2	4.82E+2
WDP	m3 world eq. deprived	2.92E-2	8.18E-1	8.95E-1	1.74E+0

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]

ND = Not Declared

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 experienced with the indicator.

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

	UNIT	A1	A2	A3	A1-A3
PM	Disease incidence	1.93E-8	1.35E-7	6.35E-7	7.89E-7
IRP	kBq U235 eq.	7.28E-3	3.52E-1	2.56E-1	6.15E-1
ETP-fw	CTUe	1.02E+1	5.18E+1	1.19E+2	1.81E+2
HTP-c	CTUh	1.58E-9	2.17E-9	1.05E-8	1.43E-8
HTP-nc	CTUh	8.57E-9	3.91E-8	1.57E-7	2.05E-7
SQP	---	7.38E-1	3.65E+1	3.13E+1	6.85E+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]

ND = Not Declared

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 experienced with the indicator.

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

	UNIT	A1	A2	A3	A1-A3
PERE	MJ	3.18E+0	1.86E+0	2.73E+2	2.78E+2
PERM	MJ	0.00	0.00	0.00	0.00
PERT	MJ	3.18E+0	1.86E+0	2.73E+2	2.78E+2
PENRE	MJ	5.85E+1	8.04E+1	4.46E+2	5.85E+2
PENRM	MJ	0.00	0.00	0.00	0.00
PENRT	MJ	5.85E+1	8.04E+1	4.46E+2	5.85E+2
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	3.63E+1	1.85E-2	2.06E-2	3.63E+1

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

ND = Not Declared

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

	UNIT	A1	A2	A3	A1-A3
HWD	kg	2.07E-5	5.04E-5	6.38E-4	7.09E-4
NHWD	kg	2.90E-2	1.64E-1	1.94E+0	2.13E+0
RWD	kg	6.89E-6	5.10E-4	3.65E-4	8.82E-4
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

ND = Not Declared

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 (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

ND = Not Declared

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 2016

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 which can be accessed via the EcoChain tool. This data portfolio contains a summary of all the data used in this LCA, and correspondingly, in Ecocem Benelux EcoChain account.

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. No emissions from the steel production are allocated onto the blast furnace slag. This approach is in accordance with CEN/TC 51 PCR for cement and building lime, 2015. The impacts related to the quenching of the blast furnace slag are allocated onto the Eco2cem production.

A2. Transport of raw materials to manufacturer

This includes the transport distance of the GBS to the manufacturing facility via road, boat and/or train.

A3. Manufacturing

This module covers the manufacturing of the Eco2cem and includes all processes linked to production such as drying, grinding and internal transportation. Use of electricity, fuels and auxiliary materials in eco2cem production is taken into account as well.



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

- EN 15804+A2:2019
- ISO 14040/14044 on Life Cycle Assessments.
- Bepalingmethode Milieuprestatie Bouwwerken v1.0
- CEN/TC 51 PCR for cement and building lime, 2015



REMARKS

None