PROGRAMME OPERATOR

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COMPANY INFORMATION

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PRODUCT

Eco$_2$cem GGBS

MRPI®-REGISTRATION

1.1.00028.2018

EPD-REGISTRATION

00000771

DATE OF ISSUE

19-10-2018

DATE OF EXPIRY

19-10-2023

DECLARED UNIT/FUNCTIONAL UNIT

1 metric ton Eco$_2$cem

SCOPE OF DECLARATION

This MRPI®-EPD+ certificate is verified by EcoChain.
The LCA study has been done by EcoReview.
The certificate is based on an LCA-dossier according to ISO14025 and NEN-EN15804+A1.
It is verified according to the EPD-MRPI® verification protocol May 2017.
EPD of construction products may not be comparable if they do not comply with NEN-EN15804+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.

VISUAL PRODUCT

DESCRIPTION OF PRODUCT

Eco$_2$cem mainly consist of ground granulated blastfurnace slag (GGBS). Granulated blastfurnace slag (GBS) is a vitrified by-product made by rapid cooling of a slag melt, obtained by smelting iron ore. Granulated slag is ground to a fine off-white powder. Eco$_2$cem is a latent hydraulic material and is normally used in combination with an activator (such as Portland cement). Eco$_2$cem is suitable for the production of cement, addition, additive and binder for concrete, mortar, and chemical construction materials, soil stabilization and – immobilization and other building products.

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
(where appropriate[b]) Third party verifier: Niels Jonkers, EcoChain
a Product Category Rules b Optional for B-to-B communication; mandatory for B-to-C communication (see EN ISO 14025:2010,9.4).

DETAILED PRODUCT DESCRIPTION

Eco$_2$cem is mostly used as cementitious binder in concrete. It has a very low environmental impact, and is used to minimize the embodied CO_2 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*	[KG]
Blast Furnace Slag	100%

*> 1% 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 (v3.4)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishement	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	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

X = included, MNA = Module Not Assessed

REPRESENTATIVENESS

This EPD is representative for products produced and sold in the EU. The Eco$_2$cem GGBS is produced in one production site in Moerdijk, The Netherlands.

ENVIRONMENTAL IMPACT per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	[kg Sb-Eq.]	5,10E-03	3,12E-02	1,58E-01	1,94E-01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
ADPF	[MJ]	2,25E-02	3,19E-02	1,72E-01	2,26E-01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
GWP	[kg CO2-Eq.]	3,20E+00	4,92E+00	2,22E+01	3,03E+01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
ODP	[kg CFC11-Eq.]	1,78E-07	7,26E-07	2,57E-06	3,47E-06	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
POCP	[kg ethene-Eq.]	2,37E-03	7,97E-04	2,50E-03	5,68E-03	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
AP	[kg SO2-Eq.]	4,23E-02	3,54E-02	3,89E-02	1,17E-01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
EP	[kg (PO4)3--Eq.]	2,19E-03	7,55E-03	6,96E-03	1,67E-02	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Toxicity indicators (only for Dutch Market)																			
HTP	[kg DCB-Eq]	2,67E+00	1,16E+00	7,40E+00	1,12E+01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
FAETP	[kg DCB-Eq]	1,02E-01	3,87E-02	7,92E-02	2,20E-01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
MAETP	[kg DCB-Eq]	1,42E+03	7,79E+02	1,77E+03	3,97E+03	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TETP	[kg DCB-Eq]	5,30E-03	8,04E-03	2,49E-01	2,62E-01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Environmental Cost Indicator (only for Dutch Market) MKI Score																			
MKI (ECI)	Euro	€ 0,75	€ 0,65	€ 2,22	€ 3,62	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

INA = Indicator Not Assessed

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

RESOURCE USE per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	4,16E+00	1,37E+00	3,05E+02	3,10E+02	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PERM	[MJ]	0	0	0	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PERT	[MJ]	4,16E+00	1,37E+00	3,05E+02	3,10E+02	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PENRE	[MJ]	5,76E+01	6,85E+01	3,57E+02	4,83E+02	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PENRM	[MJ]	0	0	0	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PENRT	[MJ]	5,76E+01	6,85E+01	3,57E+02	4,83E+02	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
SM	[kg]	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
RSF	[MJ]	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
NSRF	[MJ]	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
FW	[m3]	3,18E+01	4,98E-03	2,40E-02	3,19E+01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

INA = Indicator Not Assessed

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; INA = Indicator Not Assessed

OUTPUT FLOWS AND WASTE CATEGORIES per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	4,86E-05	4,69E-04	7,88E-04	1,31E-03	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
NHWD	[kg]	1,12E-01	1,97E-01	1,73E+00	2,04E+00	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
RWD	[kg]	2,04E-05	4,18E-04	3,98E-04	8,37E-04	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
CRU	[kg]	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
MFR	[kg]	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
MER	[kg]	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
EEE	[MJ]	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
EET	[MJ]	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

INA = Indicator Not Assessed

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; ETE = Exported Thermal energy

CALCULATION RULES

Data quality

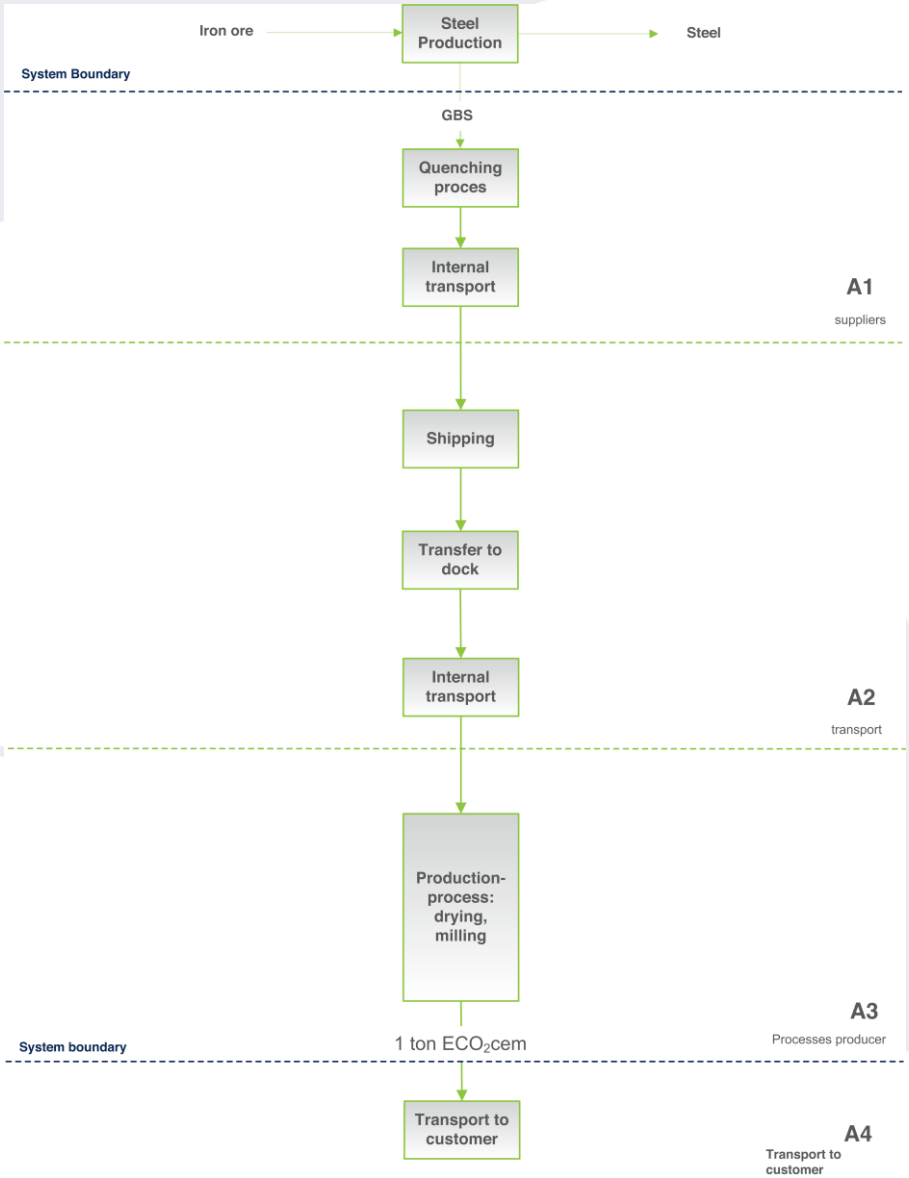
Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

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 Eco_2cem 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 Eco_2cem and includes all processes linked to production such as drying, grinding and internal transportation. Use of electricity, fuels and auxiliary materials in eco_2cem 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 15804:2012+A1:2013 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products, of 11/2013.

- ISO 14040/14044 on Life Cycle Assessments.

- CEN/TC 51 PCR for cement and building lime, 2015

REMARKS

None