Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

KJ400 GGBS

FINNSEMENTTI
A CRH COMPANY

PROGRAMME:
The International EPD® System,
www.environdec.com

PROGRAMME OPERATOR:
EPD International AB

EPD REGISTRATION NUMBER:
S-P-07419

PUBLICATION DATE:
2022-10-28

VALID UNTIL:
2027-10-04

GENERAL INFORMATION
Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product category rules (PCR):	PCR 2019:14 Construction Products – Version 1.1 c-PCR-001 Cement and building limes (EN 16908:2017)
PCR review was conducted by:	The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Chair of the PCR review: Claudia A. Peña Review date: 2020-07-10 until 2020-08-31
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	☐ EPD process certification ☒ EPD verification
Third party verifier:	Hannu Karppi, Ramboll Finland Oy
Approved by:	The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier:	☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

COMPANY INFORMATION

Owner of the EPD:
Finnsementti Oy, Skräbbölentie 18, 21600 Parainen, Finland
Contact:
Ulla Leveelahti +358 206 201 346 (ulla.leveelahti@finnsementti.fi)
Description of the organisation:
Finnsementti, A CRH company, is a Finnish manufacturer of cement and GGBS. Harnessing our century-long experience, we produce consistently superior cement and GGBS and create jobs within our industry. The majority of Finland's cement offering is produced at Finnsementti's plants in Parainen and Lappeenranta, in addition to which the company has eight terminals in Kirkkonummi, Koverhar, Mariehamn, Oulu, Jakobstad, Pori, Raahe and Vasa. In addition to cement and GGBS, our offering includes various concrete additives, admixtures and special aggregates.
Product-related or management system-related certifications:
ISO 9001:2015, ISO 14001:2015
Name and location of production site(s):
Finnsementti Oy, Raahe Plant, Ristikarinkatu 95, 92100 Raahe, Finland

PRODUCT INFORMATION

Product name:
KJ400, Raahe
Product identification:
KJ400 (CE marked, DoP_RH_KJ400_5481)
Product description:
Ground Granulated Blast Furnace Slag (GGBS) is an addition with (latent) hydraulic properties and is used in concrete manufacturing.
UN CPC code:
3744 Slag cement

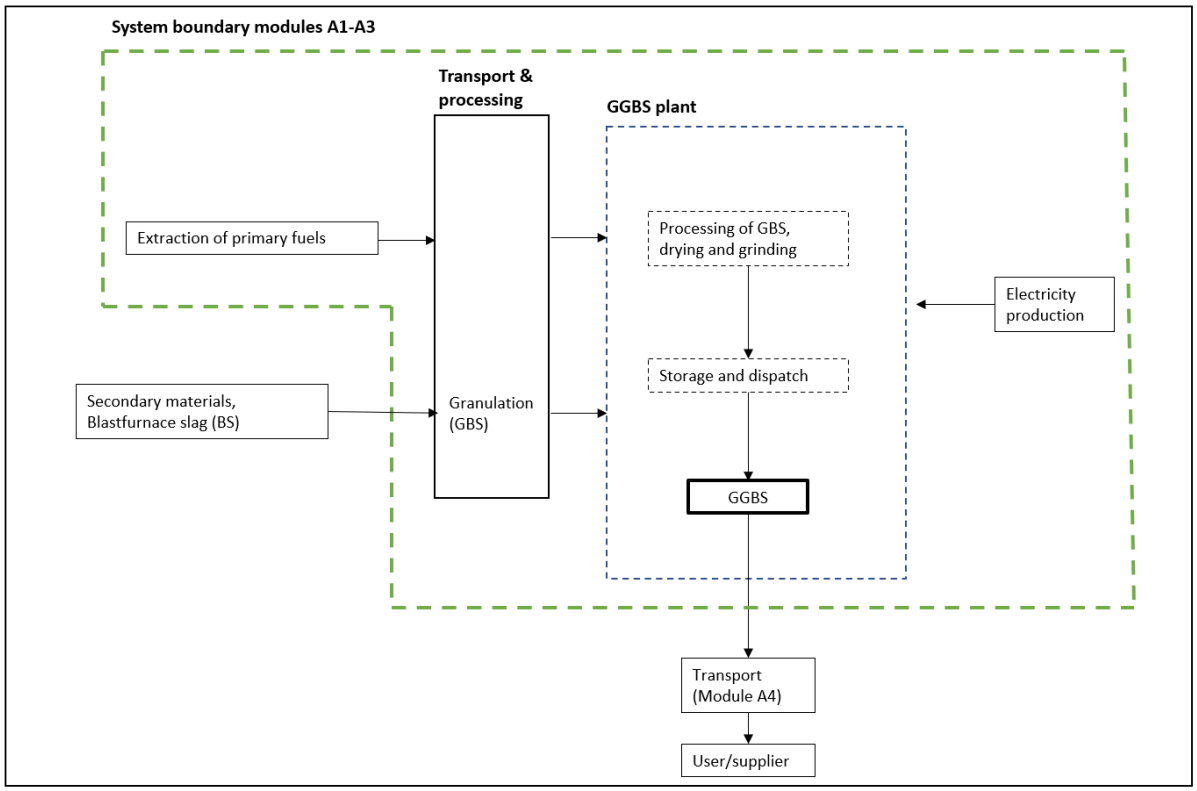
LCA INFORMATION

Functional unit / declared unit:
1 metric ton of bulk GGBS
Reference service life:
NA
Time representativeness:
All material flows of the production process is based on site-specific data gathered for one year of operation, for the period 1st January 2020 – 31st December 2021.

Database(s) and LCA software used:
The Global Concrete and Cement Association (GCCA) verified LCA Model (v3.1, International version, 10 November 2021) was used for the life cycle modelling of the considered product. The GCCA EPD Tool is a web-based calculation tool for EPDs. The life cycle assessment in the tool has been implemented in compliance with EN 15804:2012+A2:2019, PCR 2019:14 Construction products (EN 15804:A2) and complementary PCRs c-PCR-001 Cement and building limes (EN 16908) and c-PCR-003 Concrete and concrete elements (EN 16757), as well as with the General Programme Instructions (GPI 3.01) of the International EPD® System. The GCCA EPD tool is largely based on the ecoinvent v3.5 database.

Description of system boundaries:
The EPD covers the product stage, cradle to gate (A1–A3). The selected system boundaries comprise the production of GGBS including raw material supply up to the finished product at the factory gate. They are in accordance with the system boundaries given in EN 16908:2017.

SYSTEM DIAGRAM:



Assumptions about electricity production:
Finnsementti Oy electricity mix is based on the Finnish 2021 Electricity breakdown (Energiateollisuus ry, Energiavuosi 2021). The electricity is market priced electricity. The emission factor used for the electricity is 160 g CO_2-eq./kWh. The emission factor includes the total CO_2 -eq. emissions from electricity production and building the power plants.

Cut-off rules:
1 % cut-off rule was applied for input flows in the inventory.

Processes that have been excluded from the LCA study:
- Mill charge wear (less than 1% mass)
- Internal traffic (less than 1% of primary energy usage)

MODULES DECLARED, GEOGRAPHICAL SCOPE AND SHARE OF SPECIFIC DATA:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
MODULE	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules Declared	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Geography	EU	EU	EU														
Specific data used	Approx. 30 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-

X = included in LCA MND = Module Not Declared

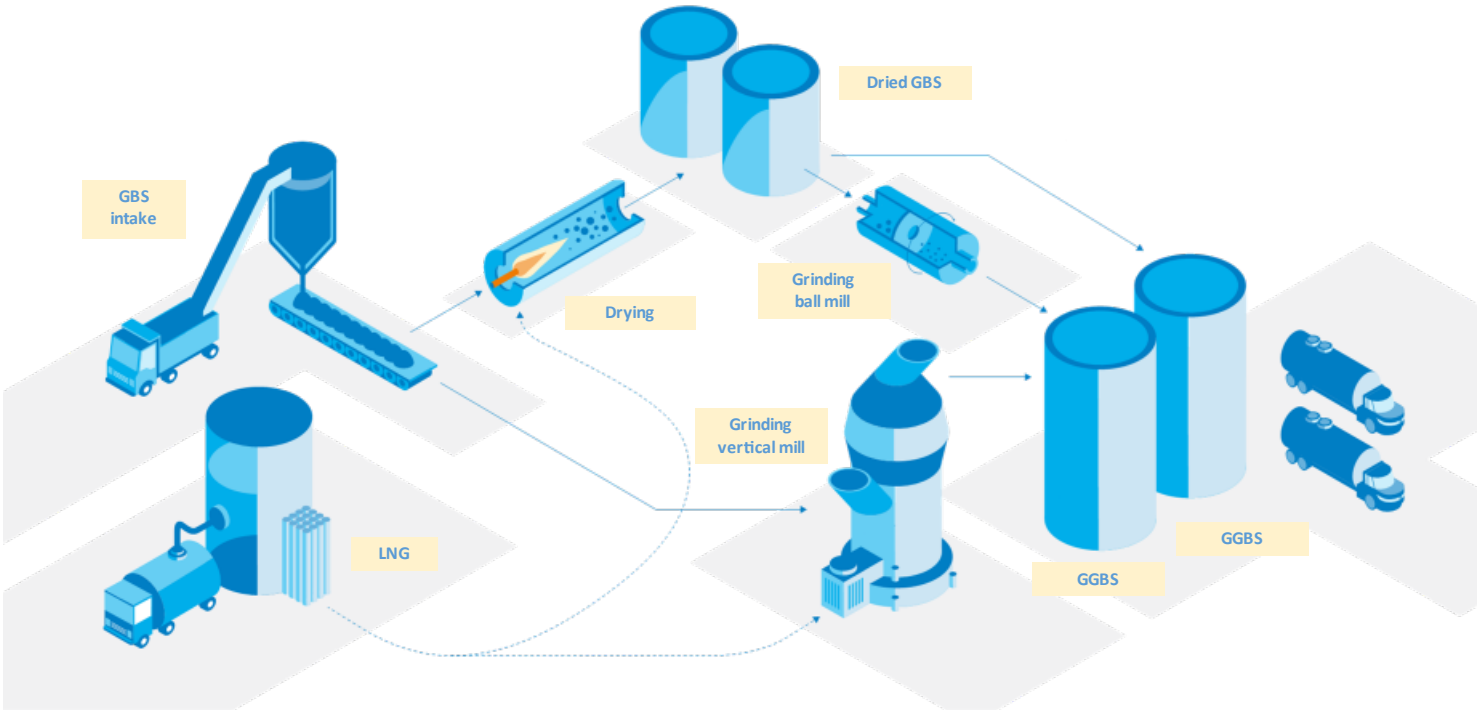
PRODUCT DESCRIPTION

GGBS
Ground Granulated Blast Furnace Slag (GGBS) is an addition with (latent) hydraulic properties. It is a finely ground inorganic material which, when mixed with water and cement, forms a paste which sets and hardens and which, after hardening, retains its strength and stability.

Use
GGBS is a constituent in cement, concrete, mortar or grout.

Manufacturing process
The granulated blast furnace slag (GBS) is extracted from the process of pig iron production, where the molten slag is quenched with cold water, producing glassy granulates. These granulates are dried and ground to a fineness suitable for concrete production.

The following figure is a schematic representation of the cement manufacturing process from quarry to dispatch (production stage, information modules A1 to A3).



Content information

Ground Granulated Blastfurnace Slag (GGBS) according to EN 15167-1 is produced by grinding. It contains no added materials.

This product does not contain substances listed in the Candidate List of Substances of Very High Concern for Authorisation (date: 13.9.2022) exceeding 0.1 percentage by mass.

ENVIRONMENTAL INFORMATION

LCA results per 1 metric t of bulk GGBS

Core environmental impact indicators			A1	A2	A3	A1-A3
Global warming potential, total	**GWP-tot**	kg $CO_{2\ eq.}$	43	0.2	26.1	**69**
Global warming potential, fossil fuels	**GWP-fos**	kg $CO_{2\ eq.}$	43	0.2	26.0	**69**
Global warming potential, biogenic	**GWP-bio**	kg $CO_{2\ eq.}$	0.02	0.00008	0.03	**0.04**
Global warming potential, land use and land use change	**GWP-luc**	kg $CO_{2\ eq.}$	0.028	0.0001	0.04	**0.067**
Ozone depletion potential	**ODP**	kg $CFC_{11\ eq.}$	3.3E-06	3.8E-08	4.0E-06	**7.4E-06**
Acidification potential	**AP**	mol H+ eq.	0.3	0.001	0.14	**0.4**
Eutrophication potential, freshwater	**EP-fw**	kg $PO_{4\ eq.}$	0.046	0.00005	0.01	**0.060**
	EP-fw*	kg P eq.	0.015	0.00001	0.004	**0.019**
Eutrophication potential, marine	**EP-mar**	kg $N_{\ eq.}$	1.1E-03	1.3E-06	5.3E-04	**1.6E-03**
Eutrophication potential, accumulated exceedance	**EP-ter**	mol $N_{\ eq.}$	0.4	0.001	0.2	**0.7**
Formation potential of tropospheric ozone	**POCP**	kg $NMVOC_{eq.}$	0.1	0.001	0.06	**0.2**
Abiotic depletion potential for non-fossil resources	**ADPE**	kg $Sb_{eq.}$	3.2E-05	3.7E-07	3.0E-05	**6.3E-05**
Abiotic depletion for fossil resources potential	**ADPF**	MJ	536	3	356	**895**
Water deprivation potential	**WDP**	m^3 eq.	6	0.02	6.3	**12**

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

Additional environmental impact indicators			A1	A2	A3	A1-A3
Potential incidence of disease due to pm emissions	**PM**	Disease incidence	7.3E-07	1.7E-08	8.0E-07	**1.6E-06**
Potential human exposure efficiency relative to U235	**IRP**	kBq U235 eq.	1.6E+03	1.7E+01	1.6E+04	**1.8E+04**
Potential comparative toxic unit for ecosystems	**ETP**	CTUe	8.6E+00	6.6E-01	1.3E+01	**2.2E+01**
Potential comparative toxic unit for humans	**HTPC**	CTUh	2.3E-07	1.3E-09	2.5E-07	**4.8E-07**
Potential comparative toxic unit for humans	**HTPNC**	CTUh	1.5E-06	3.6E-08	4.5E-06	**6.0E-06**
Potential soil quality index	**SQP**	dimensionless	91	6	1920	**2017**

Disclaimer: The results of ETP, HTPC, HTPNC and SQP environmental impact indicators shall be used with care as the uncertainties of these results are high.

Parameters describing resource use			A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw	PERE	MJ	59	0	248	**307**
Use of renewable primary energy resources used as raw materials	PERM	MJ	0	0	0	**0**
Total use of renewable primary energy resources	PERT	MJ	59	0	248	**307**
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw	PENRE	MJ	599	3	639	**1241**
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ	0	0	0	**0**
Total use of non-renewable primary energy resources	PENRT	MJ	599	3	639	**1241**
Use of secondary material	SM	kg	1100	0	0	**1100**
Use of renewable secondary fuels	RSF	MJ	0	0	0	**0**
Use of non-renewable secondary fuels	NRSF	MJ	0	0	0	**0**
Net use of fresh water	NFW	m^3	0.16	0.001	0.16	**0.32**

Other environmental information describing waste categories			A1	A2	A3	A1-A3
Hazardous waste disposed	HWD	kg	0	0	0	**0**
Non-hazardous waste disposed	NHWD	kg	0	0	0	**0.0**
Radioactive waste disposed	RWD	kg	0	0	0	**0**

Environmental information describing output flows			A1	A2	A3	A1-A3
Components for re-use	CRU	kg	0	0	0	**0**
Materials for recycling	MFR	kg	0	0	0	**0**
Materials for energy recovery	MER	kg	0	0	0	**0**
Exported energy	EE	MJ	0	0	0	**0**

Information on biogenic carbon content

The removals and emissions associated with biogenic carbon content of i) the product and ii) the packaging is not calculated. The latter is not significant or even not relevant for the cement sector. The GWB-GHG indicator is not calculated and therefore not reported. The GWP-GHG indicator can be assimilated to the GWP-tot indicator.

Extra indicators			A1	A2	A3	A1-A3
Emissions from calcination and removals from carbonation	CC	kg CO eq.	0	0	0	**0**
Emissions from combustion of waste from renewable sources	CWRS	kg CO eq.	0	0	0	**0**
Emissions from combustion of waste from non-renewable sources	CWNRS	kg CO eq.	0	0	0	**0**

ADDITIONAL INFORMATION

The development of scenarios shall be made on the finished product (e.g. concrete) and not on the upstream product GGBS.

Additional information on release of dangerous substances to indoor air, soil and water during the use stage

For additional information on emissions to indoor air, soil and water during the use stage, please refer to the respective EPDs for the downstream products such as ready-mix concrete, precast concrete, screed, plasters, mortars, grouts etc.

More information regarding Finnsementti's environmental objectives and activities as well as regarding safe and effective use and disposal of cement are available on www.finnsementti.fi.

REFERENCES

General Programme Instructions of the International EPD® System. Version 3.01.

PCR 2019:14
Construction Products. Version 1.1

EN 15804:2012-04 + A2 2019
Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products

EN 16908: 2017
Cement and building lime - Environmental product declarations – Product category rules complementary to EN 15804

EN 197-1: 2011
Cement. Part 1: Composition, specifications and conformity criteria for common cements.

Global Concrete and Cement Association (GCCA) verified LCA Model
(v3.1, International version, 10 November 2021)

Candidate List of Substances of Very High Concern for Authorization European Chemical Agency
www.echa.europa.eu