

BULWER ISLAND | General Purpose Cement

# ENVIRONMENTAL PRODUCT DECLARATION



**Program:** The International EPD® System, [www.environdec.com](http://www.environdec.com)  
**Program Operator:** EPD Australasia  
**EPD Registration No. S-P-07447**  
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In accordance with ISO 14025 and EN 15804: 2012+A2:2019  
For Bulwer Island General Purpose Cement from Cement Australia



# Program Information and Verification

## Program

The International EPD ® System

## Program Operator

EPD Australasia Ltd

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## Declaration owner

Cement Australia Pty Ltd

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

## Third Party Verifier accredited or approved by EPD Australasia Ltd

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

Bulwer Island Type GP Cement from Cement Australia Pty Ltd

77 Pamela St, Pinkenba QLD 4008 Australia

### Product Category Rules:

Version 1.11, 2021-02-05

Complementary Product Category Rules (C-PCR) to PCR 2019:14, Cement and Building Lime, Version 2022-05-18

### EPD Tool:

GCCA's Industry EPD Tool for Cement and Concrete (V3.1), International version

### Reference Year for Data:

01/01/2021-31/12/2021

# General Information

To serve increasing market demand and in particular, to facilitate whole-project, whole-life environmental impact assessment, the cement and concrete industry can provide “cradle to gate” environmental product declarations (EPDs) for their products.

The intention is that EPDs are used by engineers, architects, developers and clients to compare products that have functional equivalence and to pass environmental information down the value chain.

However, EPD’s within the same product category but from different programmes may not be comparable. They also may not be comparable if they do not comply with EN15804+A2. For further information about comparability, see EN15804+A2 and ISO14025.

The Global Cement and Concrete Association (GCCA) makes available to the concrete industry across the world a verified EPD tool (GCCA EPD Tool).

This enables producers to derive EPD data to run comparisons during product development stage and data to input into EPDs.

The GCCA EPD tool is verified against recognised international standards and relevant product category rules.

The EPD tool was originally developed under the Cement Sustainability Initiative, part of the World Business Council for Sustainable Development.

# Company information

## Owner of the EPD

**Cement Australia Pty Ltd**

## Description of the organisation

Cement Australia Holdings Pty Ltd is owned by controlled entities of Holcim Group Ltd (Switzerland) and Heidelberg Cement AG (Germany) in the proportions of 50% and 50% respectively.

Separately, a partnership has been formed between controlled entities of Holcim Group Ltd and Heidelberg Cement AG with interests held in the Cement Australia Partnership in the same proportions of 50% and 50% respectively.

Cement Australia's main business involves the manufacture and sale of cement and cementitious products in Australia. Cement Australia manufactures high performance cement products including customised blends for special applications.

In addition, we supply concrete-grade fly ash and ground granulated blast furnace slag along with high-grade lime products in bulk and packaged forms.

Our products meet required Australian Standards, and have been tested to withstand Australian climate conditions.

Cement Australia operates in accordance with its management systems which are certified to the following International Standards:

- **ISO 9001** Quality Management Systems
- **ISO 14001** Environmental Management Systems
- **ISO 45001** Occupational Health and Safety Management Systems.

## Name and location of production site(s)

**77 Pamela St, Pinkenba QLD, 4008, Australia**

The Cement Australia operations located at Bulwer Island operate 24 hours a day, 7 days a week by a skilled and experienced team with intelligent control systems, utilising the latest milling technology providing a consistent and reliable product to meet the demands of the construction materials industry.

The site employs industry best practice environmental controls at all stages of the production process going beyond compliance, to setting the industry standard in minimising our operational impacts on the receiving environment.

# Declared Products

## Product Name

Bulwer Island General Purpose Cement

## Product Identification

Bulwer Island GP

## Product Description

Bulwer Island General Purpose Cement fully complies with the Australian Standards requirements for Type GP cement described in AS3972: *General purpose and blended cements*. It also meets the requirements of Type SL and SR as per AS 3972.

Type GP Cement can be used as a cementitious binder in a broad range of applications including concrete, mortars, renders and grouts. It is ideal for a wide range of applications including:

- Domestic construction such as concrete slabs, driveways and footpaths
- Structural concrete such as pre-stressed slabs, columns and tilt-up walls
- Pavers, blocks, panels and pipes
- Mining applications
- Major engineering/civil projects requiring high quality and consistency
- Specialty formulations such as adhesives, renders, mortars and grouts.

It is produced to consistent quality standards. Type GP can be used on its own or in conjunction with other supplementary materials such as fly ash.

## UN CPC Code

3744

## Product Composition

Nominal product composition of GP per tonne of cement.

Material Description	Composition (%)	Post Consumer Material (%)	Renewable Material (%)
Clinker	87.5	0.0	0.0
High grade limestone	7.5	0.0	0.0
Gypsum	5	0.0	0.0

\*Product is sold as bulk, therefore no packaging component.

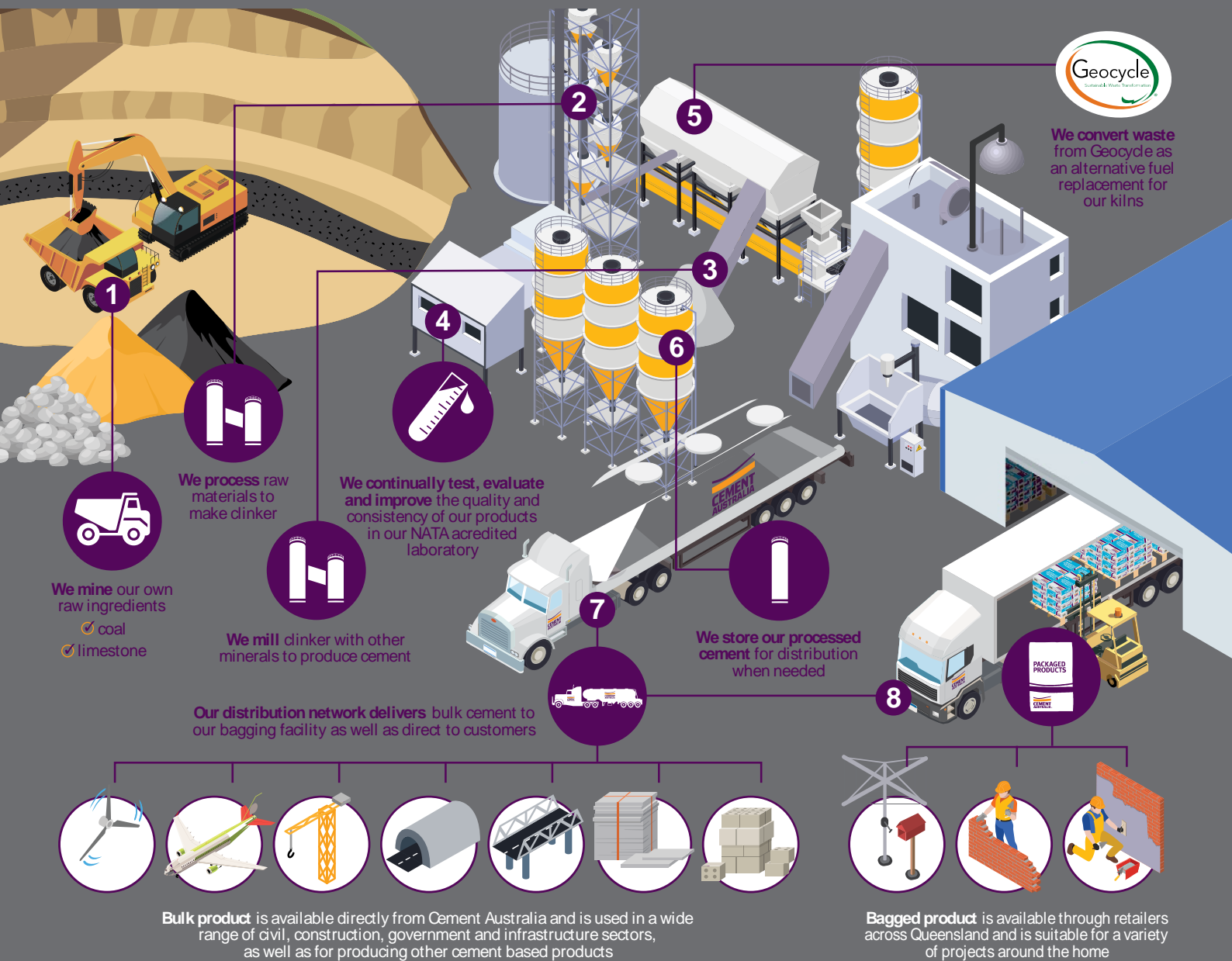
\*This product is classified as Hazardous according to the Safe Work Australia guidelines for Globally Harmonised System of Classification and Labelling of Chemicals (GHS)

# Cement Australia Process Overview



**Mined. Milled. Manufactured.**

Our cement has been proudly Made Right Here in Queensland since 1914



# Life Cycle Assessment (LCA) Information

## Description of System Boundaries

This EPD covers the cradle to gate life cycle stages (A1–A3) of cement production.

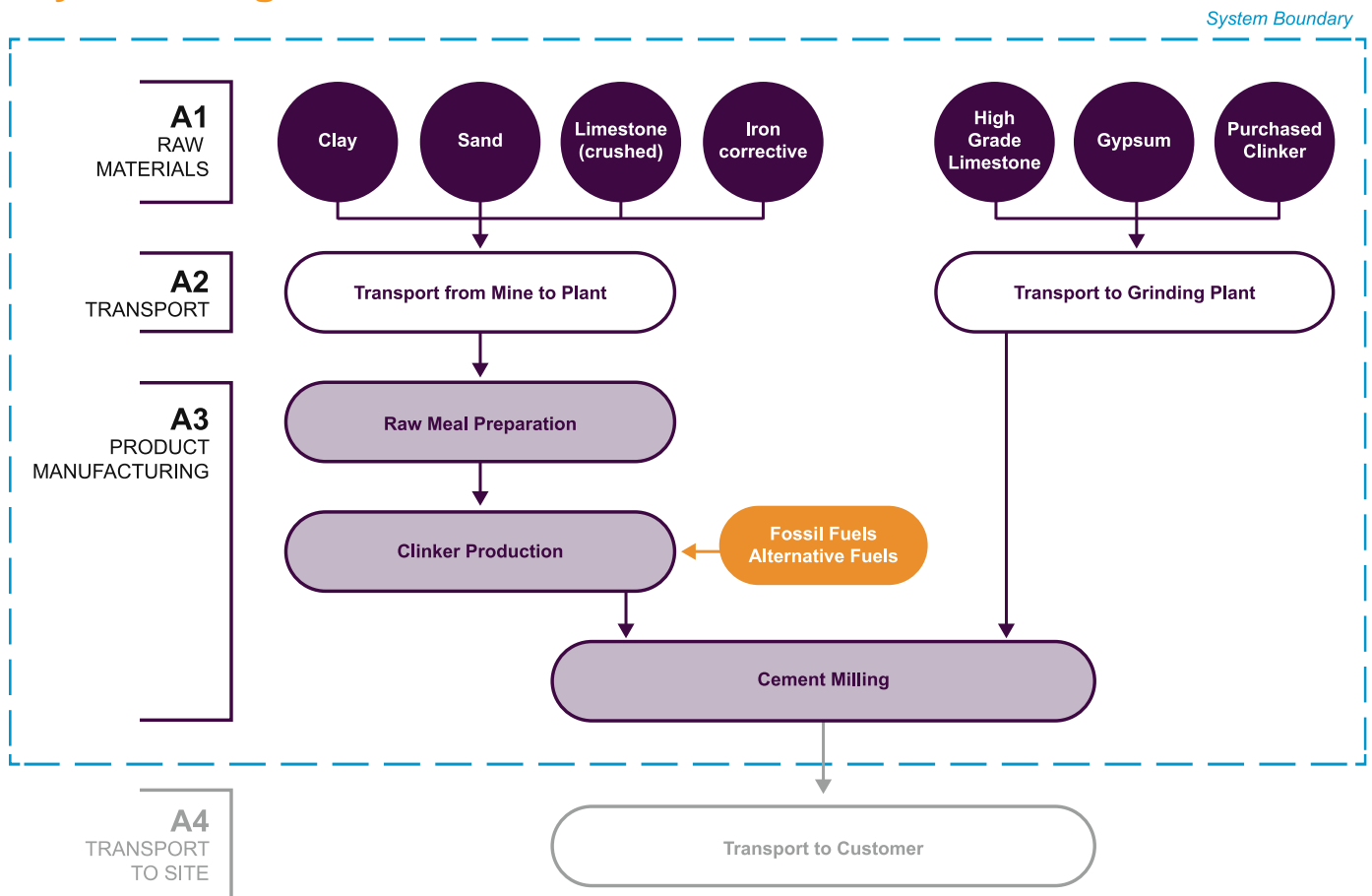
This system includes the extraction and production of raw materials, transportation of raw materials to the cement plant, cement manufacturing process (including onsite transportation) and treatment of waste produced within the processes throughout the cement plant.

According to EN 15804+A2 Section 5.2, EPDs of this type shall only be used where the following three conditions are valid:

- the product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life, and
- the product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process, and
- the product or material does not contain biogenic carbon.

All processes related to the use stage, and end of life of cement and module D are outside the scope of this EPD as cement will be used as a mix component in manufacturing for other products (i.e., concrete and masonry) and cement cannot be physically separated from other products at end of life.

## System Diagram



# Life Cycle Assessment (LCA) Information

## Scope of EPD

	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
<b>Module</b>	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
<b>Modules Declared</b>	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

X - Module is included in this study, ND - Module is not declared

## Declared Unit

1 tonne

## Reference Service Life

Not applicable

## Time Representativeness

All material and energy flows within the scope of the study are based on plant specific data collected between 01/01/2021 – 31/12/2021.

## Database(s) and LCA Software Used

GCCA EPD tool EN59 A2 software. Industry EPD Tool for Cement and Concrete (V3.1), International version.

The life cycle inventory database used in the tool is the ecoinvent database (v3.5), cut-off system model. The ecoinvent LCI database is the most widely used LCI database worldwide and the reference database for a large number of EPDs and sector-specific LCI datasets.



# Life Cycle Assessment (LCA) Information

## Background Data

The data provided for use in this EPD has been taken directly from the Bulwer Island Technical Information System (TIS) network and reflects real time data measured and collated by our process systems. All applicable data is derived by devices and instrumentation that are calibrated against the relevant Australian and International standards.

The source of Electricity supply data is the Department of Industry, Science, Energy and Resources (2021) Australian Energy Statistics, Table O. Energy usage data is monitored through site meters and energy billing information.

### *Australian electricity generation, by fuel type, physical units, calendar year 2020 - QLD*

Non Renewable Fuels	GWh	Renewable Fuels	GWh
Black Coal	4.71E4	Biomass	1.22E3
Brown Coal	0.0E0	Wind	1.37E3
Natural Gas	1.15E4	Hydro	6.51E2
Oil Products	9.85E2	Large-scale solar PV	3.40E3
		Small-scale solar PV	4.61E3
		Geothermal	0.0
<b>Total</b>	<b>5.96E4</b>	<b>Total</b>	<b>1.12E4</b>
<b>Percentage supply</b>	<b>84%</b>	<b>Percentage supply</b>	<b>16%</b>

Transport distances were calculated based on the distance between the material source and its destination.

# Life Cycle Assessment (LCA) Information

## Data Quality

Information and data utilised in this document is correct and factual at time of development.

High data quality is achieved through the use of real time, independently calibrated monitoring systems which capture resource use. Overall, the data quality for this LCA was considered High.

The EPD will be updated if changes in its life cycle inventory led to a variation of 10% or more in any of the included environmental indicators during its validity period.

Module	Input/Output	Data Source	Temporal Scope	Quality
A1	Clinker (CA produced at plant)	Bulwer Island Technical Information System	2021	High
	Gypsum			
	Limestone			
	Imported Clinker	Supplier provided	2021	Medium
A2	Transport	Actual Transport distances per trip	2021	High
A3	Electricity and natural gas used for manufacturing of cement	Site Electricity and gas meters & billing information	2021	High

# Life Cycle Assessment (LCA) Information

## Cut Off Rules

According to EN15804+A2, Section 6.3.6, LCA data shall include a minimum of 95% of total inflows (mass and energy) per module. In addition, if less than 100% of the inflows are accounted for, proxy data or extrapolation should be used to achieve 100% completeness.

For this LCA, it has been assumed that capital equipment and personnel have an impact that is not material and thus have not been included in the system boundary.

In addition, personnel travel to and from work has also not been included as it is assumed if they were not employed by Cement Australia for the production of cement, they would be employed by another business.

Based on this guidance, all inflows and outflows have been accounted for.

## Allocation Rules

For Secondary Materials (Co-Products), EN15804+A2 allocation rules require allocation to be based on physical properties (e.g., mass or volume) when the difference in value from the co-products is low (difference in revenue of the main and co-product is less than 25%).

For co-products where the difference in revenue from the main and co-product is greater than 25% (e.g co-product revenue is 10% of main product revenue), an economic allocation factor shall be determined and reported in the data survey.

Regarding inputs into Clinker, iron corrective has been allocated economically. Other secondary material inputs are defined as waste and have a zero allocation as they have no end use.

## Assumptions

The key choices and assumptions in this LCA are:

- The environmental profiles are largely influenced by the primary data, which are considered high quality.
- The Imported clinker Global Warming Potential figure was provided by Cement Australia's supplier and represents the emissions figure reported to their local regulator as part of regulatory emissions reporting. This figure has been benchmarked against similar plant figures and is representative.
- Transport distances have been calculated as a direct route from material source to plant.

# Environmental Indicators

## Impact categories included in this assessment

Core environmental impact indicators	Acronym	Unit
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO <sub>2</sub> equivalent
Global warming potential (total)	GWP (total)	kg CO <sub>2</sub> equivalent
Global warming potential (fossil)	GWP (fossil)	kg CO <sub>2</sub> equivalent
Global warming potential (biogenic)	GWP (biogenic)	kg CO <sub>2</sub> equivalent
Global warming potential (land use / land transformation)	GWP (luluc)	kg CO <sub>2</sub> equivalent
Ozone depletion potential	ODP	kg CFC-11 equivalent
Acidification Potential	AP	mol H <sup>+</sup> eq.
Eutrophication – aquatic freshwater	EP - freshwater	kg P equivalent
Eutrophication – aquatic marine	EP - marine	kg N equivalent
Eutrophication – terrestrial	EP - terrestrial	mol N equivalent
Photochemical ozone creation potential	POCP	Kg NMVOC equivalent
Abiotic depletion potential for mineral elements	ADPE	kg Sb equivalent
Abiotic depletion potential for fossil fuels	ADPF	MJ
Water Depletion Potential	WDP	m <sup>3</sup> equivalent

# Environmental Indicators

## Parameters describing resource use

Resource Use indicators	Acronym	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ <sub>NCV</sub>
Use of renewable primary energy resources used as raw materials	PERM	MJ <sub>NCV</sub>
Total use of renewable primary energy resources	PERT	MJ <sub>NCV</sub>
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ <sub>NCV</sub>
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ <sub>NCV</sub>
Total use of non-renewable primary energy resources used as raw materials	PENRT	MJ <sub>NCV</sub>
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ <sub>NCV</sub>
Use of non-renewable secondary fuels	NRSF	MJ <sub>NCV</sub>
Use of net fresh water	FW	m <sup>3</sup>

## Parameters describing waste

Waste Category	Acronym	Unit
Hazardous waste disposed	HWP	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg

# Environmental Indicators

## Parameters Describing Output Flows

Output flows	Acronym	Unit
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported Energy	EE	MJ

## Additional Environmental Impacts

Disease potential	Acronym	Unit
Potential incidence of disease due to PM emissions	PM	Disease incidence
Potential Human exposure efficiency relative to U235	IRP	kBq U-235 eq
Potential Comparative Toxic Unit for ecosystems	ETP-fw	CTUe
Potential Comparative Toxic Unit for humans - cancer	HTP-c	CTUh
Potential Comparative Toxic Unit for humans - non-cancer	HTP-nc	CTUh
Potential soil quality index	SQP	dimensionless

## Extra Indicators

Disease potential	Acronym	Unit
Emissions from calcination and removals from carbonation	CC	kg CO <sub>2</sub> equivalent
Emissions from combustion of secondary fuels from renewable sources used in production processes	CWRS	kg CO <sub>2</sub> equivalent
Emissions from combustion of secondary fuels from non-renewable sources used in production processes	CWNRS	kg CO <sub>2</sub> equivalent
Removals and emissions associated with biogenic carbon content of the bio-based product	GWP-Prod	kg CO <sub>2</sub>
Removals and emissions associated with biogenic carbon content of the bio-based packaging	GWP-Pack	kg CO <sub>2</sub>

# Environmental Performance Results

## Potential Environmental Impact – Mandatory Indicators according to EN 15804+A2

### Core Environmental Indicators

Indicator	Unit	Tot.A1-A3
GWP-GHG	kg CO <sub>2</sub> equivalents	8.61E2
GWP-total	kg CO <sub>2</sub> eq.	8.61E2
GWP-fossil	kg CO <sub>2</sub> eq.	8.61E2
GWP-biogenic	kg CO <sub>2</sub> eq.	7.60E-2
GWP-luluc	kg CO <sub>2</sub> eq.	6.49E-2
ODP	kg CFC 11 eq.	9.39E-6
AP	mol H <sup>+</sup> eq.	3.47E0
EP-freshwater	kg P eq.	1.65E-1
EP-marine	kg N eq.	1.04E-2
EP-terrestrial	mol N eq.	6.95E0
POCP	kg NMVOC eq.	1.70E0
ADPE	kg Sb eq.	1.77E-4
ADPF	MJ	4.24E3
WDP	m <sup>3</sup>	5.73E1

Per tonne cement produced

\* 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.

# Environmental Performance Results

## Parameters describing resource use

Indicator	Unit	Tot.A1-A3
PERE	MJ	1.48E2
PERM	MJ	0.00E0
PERT	MJ	1.48E2
PENRE	MJ	4.34E3
PENRM	MJ.	0.00E0
PENRT	MJ	4.34E3
SM	kg	6.92E1
RSF	MJ	1.96E1
NRSF	MJ	3.26E2
FW	m <sup>3</sup>	1.45E0

*Per tonne cement produced*



# Environmental Performance Results

## Parameters describing waste

Indicator	Unit	Tot.A1-A3
HWD	kg	0.00E0
NHWD	kg	4.16E-1
RWD	kg	0.00E0

*Per tonne cement produced*

## Parameters describing output flows

Indicator	Unit	Tot.A1-A3
CRU	kg	0.00E0
MFR	kg	0.00E0
MFRE	kg	0.00E0
EE	MJ per energy carrier	0.00E0

*Per tonne cement produced*

## Extra Indicators

Indicator	Unit	Tot.A1-A3
CC	kg CO <sub>2</sub> eq.	4.72E2
CWRS	kg CO <sub>2</sub> eq.	2.45E-2
CWNRS	kg CO <sub>2</sub> eq.	2.76E1
GWP-Prod	Kg CO <sub>2</sub>	0.0E0
GWP-Pack	Kg CO <sub>2</sub>	0.0E0

*Per tonne cement produced*

# Environmental Performance Results

## Potential Environmental Impact – Additional Mandatory and Voluntary Indicators

Indicator	Unit	Tot.A1-A3
PM	Disease incidence	2.06E-5
IRP	kBq U235 eq	3.71E3
ETP	CTUe	3.17E3
HTPC	CTUh	1.69E-6
HTPNC	CTUh	4.82E-5
SQP	dimensionless	1.55E3

*Per tonne cement produced*

# References

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