ENVIROCORE 100 EPD

NORTH ISLAND – AUCKLAND – ENVIROCORE 100

Managed By: Holcim NZ Ltd
EPD Process Certificate No. 1012
Verified Accreditation Body: Epsten Group, Inc.
EPD Registration No. S-P-08439

Valid From 7 June 2023 | **Valid To** 7 June 2028
Revision Date: 7 June 2023
Revision Number: 1.0
Geographical Scope: New Zealand

HOLCIM | AUSTRALASIA EPD® ENVIRONMENTAL PRODUCT DECLARATION | ECO PLATFORM EPD VERIFIED

In accordance with ISO 14025 and EN15804+A2
Program: The International EPD® System | www.environdec.com
Program Operator: EPD Australasia Limited | www.epd-australasia.com

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Revision Number	Revision Date	Description of Changes
1.0	7 June 2023	N/A

INTRODUCTION

Cement is a key ingredient in the most commonly used building material in the world. Each year in New Zealand, over 1.5 million tonnes of traditional cement is used, generating 1.23 million tonnes of CO_2.[1]

This clearly demonstrates both the essential need for construction materials now and in the future, as well as the necessity for the construction materials industry to be a leading part of the solution addressing climate change.

With Aotearoa committed to net zero by 2050, Holcim New Zealand is building progress for a lower carbon footprint in the built environment.

For us, building progress means a complete range of low carbon, high-performance, and specialty cement and cement binders suitable for Aotearoa's homes, buildings, and infrastructure. It means advice, tools and resources to help you specify your next project with confidence. It means solutions that are right for you each and every time.

Together, we can build better to help decarbonise Aotearoa.

[1] International Energy Agency (IEA) report *"The Future of Cement in a Carbon-Constrained World"* (2018); Cement and Concrete Association of New Zealand - Key Facts and Figures; The International Energy Agency (IEA) Cement Technology Roadmap 2009 estimates that the production of 1 tonne of cement results in the emission of approximately 0.82 tonnes of CO_2. Using the conversion factor of 0.82 tonnes of CO_2 per tonne of cement, the production of 1.5 million tonnes of cement in New Zealand would result in the emission of approximately 1.23 million tonnes of CO_2. The actual amount of CO_2 emissions may vary.

ABOUT HOLCIM NEW ZEALAND

BUILDING PROGRESS

Holcim New Zealand (NZ) is a leading solutions provider for your design and construction needs in New Zealand, dating back to 1888. Today, we supply essential construction materials from import terminals, depots, and quarries to customers. Our cement and aggregates are used in ready-mix concrete, engineered precast concrete, and prestressed concrete solutions for various projects throughout the country.

This EPD provides our stakeholders with confidence about the environmental impact of our products.

Globally, Holcim is 60,000 people around the world who are passionate about building progress for people and the planet through four business segments: Cement, Ready-Mix Concrete, Aggregates and Solutions & Products.

Sustainability is at the core of our global strategy, with our industry's first 2030 and 2050 net-zero targets validated by the Science Based Targets initiative for all scopes. We are leading the transition towards low-carbon construction and driving a circular economy by providing materials and solutions that are re-shaping the way our industry builds. Holcim NZ has developed a range of low carbon cements and cement replacements specifically for the New Zealand market.

LOW CARBON CEMENT IN NEW ZEALAND

HOLCIM NZ'S CEMENT AT A GLANCE

Holcim NZ provides project-specific, on-demand Environmental Product Declarations (EPDs) to customers. This capability represents a significant step in Holcim NZ's sustainability journey and embodies our multi-disciplinary approach to embedding sustainability into our organisation and operations. With the introduction of our cement blends, third-party verified data will underpin our capability to work with our customers from tender through to design and construction to optimise sustainability performance.

Holcim NZ's cementitious materials are backed by an EPD Process Certification. It's not only a first for cement, but a first for any product in New Zealand. Our EPD Process Certification is a stamp of approval to produce compliant EPDs in-house, opening up significant capability and flexibility in producing and using life cycle impact data to inform our operations and our customers.

To gain our EPD Process Certification, Holcim invested in embedding Life Cycle Assessment (LCA) into our systems and processes. We have satisfied a rigorous, third-party evaluation in accordance with the relevant ISO standards and guidelines of the International EPD Program and EPD Australasia. [2]

This EPD has been developed using our EPD Process Certification for NORTH ISLAND - AUCKLAND - ENVIROCORE 100 with production occurring at AUCKLAND.

[2] 5-6 and 8-12 in the References section.

LCA INFORMATION

Declared Unit

1 tonne of cementitious material

Reference Service Life (RSL)

The RSL is not specified as the scope is from cradle to gate with distribution (module A4) option.

Time Representativeness

The plant data for the LCA is based on 2021 calendar year production data. The mix data for the LCA is based on 2021 calendar year production data.

Databases and LCA Software Used

SimaPro® LCA software (v 9.4) was used for the LCA modelling which developed the LCA Calculator, used as per the certified EPD Process. It uses background data from:

1. The Australian Life Cycle Inventory Database (AusLCI v1.39) (2022)[3]
2. Ecoinvent 3.8 (2021)

The environmental impacts modelled from the existing EPDs do not include impacts for the additional Green Star (v1.2) impact categories included in the environmental impact tables. The following impact categories were calculated manually for the foreground data:

- Use of renewable primary energy resources used as raw materials
- Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials
- Use of secondary materials
- Use of renewable secondary fuels
- Use of non-renewable secondary fuels

Allocation

Allocation was necessary to proportion inputs and outputs to intermediate flows and processes at the plant level. As much as possible, intermediate flows were allocated physically based on the weight of cement.

Ground granulated blast furnace slag from steel blast furnace production was allocated economically. Please refer to the “Recycled Material” section for further detail.

Cut-Off Criteria

No flows were excluded on the basis of cut-off criteria.

Address and Contact Information

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[3] Australian Life Cycle Inventory Database Initiative (AusLCI). (2022). Guidelines for Data Development for an Australian Life Cycle Inventory Database, Data Standard.

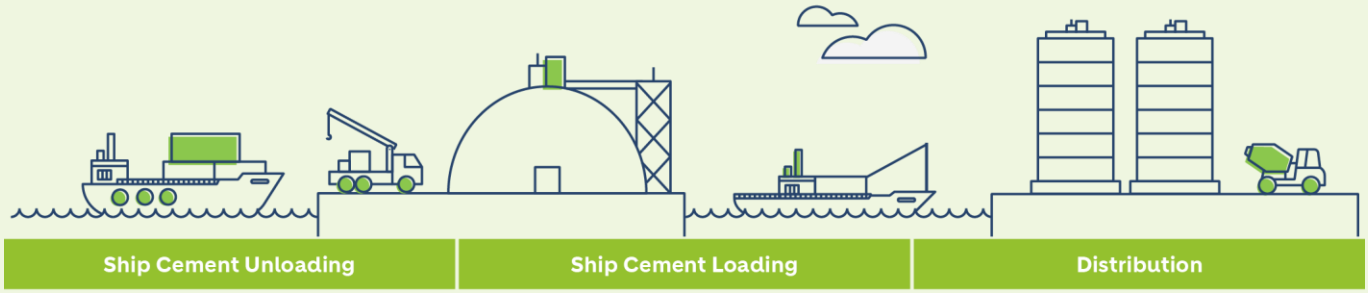
Data Quality

Data quality for the foreground data was assessed in terms of geographic and temporal representativeness. All data sources were scored medium or higher.

Background data sources were also assessed with respect to their timeliness, with all data sources being updated within the 10 years required under PCR 2019:14.

SYSTEM DIAGRAM

The processes included in the LCA are presented in a process diagram in the figure below.



DESCRIPTION OF SYSTEM BOUNDARIES AND EXCLUDED LIFECYCLE STAGES

The scope of the LCA and EPD is from cradle to gate (A1-A4). Life cycle stages beyond Holcim's gate are excluded from the LCA (see figure below).

Environmental impacts relating to personnel, infrastructure and production equipment not directly consumed in the process are excluded from the system boundary as per the Product Category Rules (2019:14 Construction Production and Construction Services).

Product Stage			Construction Stage		Use Stage							End of Life Stage				Benefits & loads for the next product system
Raw Material Supply	Transport	Manufacturing	Transport	Construction/Installation process	Use	Maintenance incl. transport	Repair incl. transport	Replacement incl. transport	Refurbishment incl. transport	Operational Energy Use	Operational Water Use	De-construction & Demolition	Transport	Re-use Recycling	Final 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	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND: Module not declared

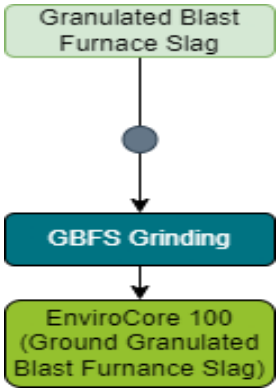
EPD PRODUCT DESCRIPTION AND USE

HOLCIM NZ'S CEMENTITIOUS PRODUCTS NORTH ISLAND – AUCKLAND – ENVIROCORE 100

A detailed breakdown of the functional properties of the cement included in this EPD are provided below. Product environmental information should only be compared with consideration of the product's requisite function.

NORTH ISLAND - AUCKLAND - ENVIROCORE 100

Manufacturing process and flow diagram



ENVIROCore 100 – North Island			
MIX DESCRIPTIONS			
Region	**Plant**	**Product brand**	**Description of use**
North Island	Auckland	ENVIROCore 100	Supplementary Cementitious Material

Content Declaration

The following table provides a summary of the materials included in Holcim's cement and their relative composition by weight. The gross weight of this declared material makes up a minimum of 99% of the products covered by this EPD.

Packaging

Holcim cement is delivered in either bulk or packaging.

Recycled Material

BS EN 16757:2017 specifically lists the following materials relevant to the study as co-products:

- Fly ash;
- Ground granulated blast furnace slag; and

As such, the above materials are considered as co-products of their production process and the impacts for their production process are allocated according to PCR 2019:14 Construction Products and Construction Services (co-produced goods, multi-output allocation).

Default background data from LCA databases was used to model the above co-products:

- Fly ash: AusLCI process for fly ash treats it as a waste material and only includes transport impacts.
- Ground granulated blast furnace slag: the AusLCI process for slag is allocated based on economic value, as the product has a significant economic value at the point of collection.

The allocation approach of the AusLCI LCA database was adopted as a default for secondary data and processes (eg. secondary fuel in cement production). The AusLCI dataset conforms to EN 15804 when applying allocation to its various processes and sub-processes.

Item	Hazardous Content	Mass (%)	Post-consumer material (%)	Renewable Material (%)
GGBFS		**100%**	**0**	**0**

ENVIRONMENTAL PERFORMANCE

The environmental impacts considered in this EPD are listed in the table below.
All further tables from this point will contain abbreviation only.

Impact Category	Abbreviation	Measurement
Potential Environmental Impacts		
Total global warming potential	GWPT	kg CO_2 equivalents (GWP100)
Global warming potential (fossil)	GWPF	kg CO_2 equivalents (GWP100)
Global warming potential (biogenic)	GWPB	kg CO_2 equivalents (GWP100)
Global warming potential (land use/ land transformation)	GWPL	kg CO_2 equivalents (GWP100)
Ozone depletion potential	ODP	kg CFC 11 equivalents
Acidification potential	AP	mol H+ eq.
Eutrophication – aquatic freshwater	EP - freshwater	kg PO43- equivalents
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 equivalents
Abiotic depletion potential (elements)	ADPE	kg Sb equivalents
Abiotic depletion potential (fossil fuels)	ADPF	MJ net calorific value
Water Depletion Potential	WDP	m3 equivalent deprived
Resource use		
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ, net calorific value
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value
Use of net fresh water	FW	m3
Waste categories and Output flows		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed/stored	RWD	kg
Components for reuse	CFR	kg

Impact Category	Abbreviation	Measurement
Materials for recycling	MFR	kg
Materials for energy recovery	MFEE	kg
Exported energy	EE - e	MJ per energy carrier
Exported energy, thermal	EE - t	MJ per energy carrier
Additional environmental impacts		
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO_2 equivalents (GWP100)
Particulate matter	PM	disease incidence
Ionising radiation - human health	IRP	kBq U-235 eq
Eco-toxicity (freshwater)	ETP-fw	CTUe
Human toxicity potential - cancer effects	HTP-c	CTUh
Human toxicity potential - non cancer effects	HTP-nc	CTUh
Soil quality	SQP	dimensionless

NORTH ISLAND – AUCKLAND – ENVIROCORE 100 – MODULE A1-A3

Primary indicators – 1 tonne of cement

		ENVIRONMENTAL IMPACTS													
		GWP - F	GWP - B	GWP - Luluc	GWP - T	ODP	AP	EP - F	EP - F2	EP - M	EP - T	POCP	ADP	ADPF	WDP
Plant	Product brand	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC-11 eq	mol H+ eq	kg PO4. 3- eq	kg P eq	kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ	m3 eq deprived
Auckland	ENVIROCore 100	157.80	3.81E-01	1.53E-03	158.18	1.35E-05	2.79	0.02	7.86E-03	0.55	6.10	1.54	6.23E-05	1856.05	22.72

NORTH ISLAND – AUCKLAND – ENVIROCORE 100 – MODULE A1-A3

Resource use parameters - 1 tonne of cement

		RESOURCE USE									
		PERE	PERM	PERT	PENRE	PENRM	PENRT	SM	RSF	NRSF	FW
Plant	Product brand	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m3
Auckland	ENVIROCore 100	3.9E+02	0.0E+00	3.9E+02	1.9E+03	0.0E+00	1.9E+03	0.0E+00	0.0E+00	0.0E+00	1.8E-01

NORTH ISLAND – AUCKLAND – ENVIROCORE 100 – MODULE A1-A3

Waste categories and output flows - 1 tonne of cement

		WASTE CATEGORIES AND OUTPUT FLOWS							
		HWD	NHWD	RWD	CRU	MFR	MFRE	EE - e	EE - t
Plant	Product brand	kg	kg	kg	kg	kg	kg	MJ	MJ
Auckland	ENVIROCore 100	3.25E-03	5.17E+00	4.17E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

NORTH ISLAND – AUCKLAND – ENVIROCORE 100 – MODULE A1-A3

Additional indicators 1 tonne of cement

		ADDITIONAL ENVIRONMENTAL IMPACTS						
		GWP-GHG	PM	IRP	ETP - fw	HTP - c	HTP - nc	SQP
Plant	Product brand	kg CO_2 eq	disease incidence	kBq U-235 eq	CTUe	CTUh	CTUh	Pt
Auckland	ENVIROCore 100	155.27	5.88E-06	8.56E-02	1.30E+03	3.50E-08	1.49E-06	3.59E+02

NORTH ISLAND – AUCKLAND – ENVIROCORE 100 – MODULE A4

Primary indicators – 1 tonne of cement

		ENVIRONMENTAL IMPACTS													
		GWP - F	GWP - B	GWP - Luluc	GWP - T	ODP	AP	EP - F	EP - F2	EP - M	EP - T	POCP	ADP	ADPF	WDP
Plant	Product brand	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC-11 eq	mol H+ eq	kg PO4. 3- eq	kg P eq	kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ	m3 eq deprived
Auckland	ENVIROCore 100	0.00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00

NORTH ISLAND – AUCKLAND – ENVIROCORE 100 – MODULE A4

Resource use parameters - 1 tonne of cement

		RESOURCE USE									
		PERE	PERM	PERT	PENRE	PENRM	PENRT	SM	RSF	NRSF	FW
Plant	Product brand	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m3
Auckland	ENVIROCore 100	0.00E+00	0.00E+00	0.00	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

NORTH ISLAND – AUCKLAND – ENVIROCORE 100 – MODULE A4

Waste categories and output flows - 1 tonne of cement

		WASTE CATEGORIES AND OUTPUT FLOWS							
		HWD	NHWD	RWD	CRU	MFR	MFRE	EE - e	EE - t
Plant	Product brand	kg	kg	kg	kg	kg	kg	MJ	MJ
Auckland	ENVIROCore 100	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

NORTH ISLAND – AUCKLAND – ENVIROCORE 100 – MODULE A4

Additional indicators 1 tonne of cement

		ADDITIONAL ENVIRONMENTAL IMPACTS						
		GWP-GHG	PM	IRP	ETP - fw	HTP - c	HTP - nc	SQP
Plant	Product brand	kg CO_2 eq	disease incidence	kBq U-235 eq	CTUe	CTUh	CTUh	Pt
Auckland	EnviroCore Slag	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PREVIOUS VERSION

N/A

REFERENCES

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PROGRAM-RELATED INFORMATION AND VERIFICATION

Declaration Owner	HOLCIM	**Holcim (New Zealand) Ltd** 23 Plumer Street, Central Auckland 1010, New Zealand www.holcim.co.nz
EPD Program Operator	AUSTRALASIA EPD® ENVIRONMENTAL PRODUCT DECLARATION	**EPD Australasia Limited** 315a Hardy Street Nelson 7010, New Zealand www.epd-australasia.com | info@epd-australasia.com +64 9 889 2909
EPD Produced by	HOLCIM	**Holcim (New Zealand) Ltd** 23 Plumer Street, Central Auckland 1010, New Zealand www.holcim.co.nz
EPD Process Certified by	epstengroup	**Epsten Group** Suite 2600, 101 Marietta St NW, Atlanta, Georgia 30303, USA www.epstengroup.com
EPD Registration Number	S-P-08439	
Valid From	7 JUNE 2023	
Version	1.0	
Valid Until	7 JUNE 2028	
Product category rules	PCR 2019:14 Construction Products and Construction Services, Version 1.2.5, 2022-06-22	
Product group classification	**UN CPC 374**	
Geographical Scope	New Zealand	
Reference Year for Data	2021 Plant Data, 2023 Year Produced	

CEN standard EN 15804:2012+a1:2013 served as the core PCR

Product category rules	PCR 2019:14 Construction Products and Construction Services, Version 1.2.5, 2022-06-22
PCR review was conducted by	The Technical Committee of the International EPD® System. Chair: Claudia A. Peña. Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	☒ EPD process certification ☐ EPD verification
EPD Process Certified by	Epsten Group, Inc. Accredited by: A2LA, Certificate #3142.03
Procedure for follow-up of data during EPD validity involves third party verifier:	☒ Yes ☐ No

Programme-related information and verification

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.

Contact your Holcim representative today for more information.

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