BORAL

Building something great

Bulk Cement and Cementitious Products EPD

Environmental Product Declaration

Victoria (VIC) region

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

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.epd-australasia.com

EPD Registration Number S-P-05506

Publication date: 20 May 2023| **Valid until:** 20 May 2028| **Geographical Scope:** Victoria (VIC) region, Australia

Contents

Program information and verification

An Environmental Product Declaration (EPD) is a standardised way of quantifying the potential environmental impacts of a product or system. EPDs are produced according to a consistent set of rules — Product Category Rules (PCR) — that define the requirements within a given product category.

These rules are a key addition to ISO 14025, ISO 14040 and ISO 14044 as they enable transparency and comparability between EPDs. This EPD provides environmental indicators for Boral Cement products manufactured in Victoria (Vic). This EPD is a **'cradle-to-gate'** declaration covering production of cementitious products and their supply chain.

This EPD is verified to be compliant with EN 15804+A2. EPDs of construction products may not be comparable if they do not comply with EN 15804. EPDs within the same product category but from different programs or utilising different PCRs may not be comparable.

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

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Program information and verification

EPD version:	Description of the changes
Version 1.0	As this is the first Victorian EPD, there are no changes to report.
Type of EPD:	Product-specific EPD (no averaging across sites or manufacturers).
Reference year for data:	Product recently on the market – LCI data is not yet based on one year of production. The EPD will be updated and re-verified when data from one year of production is available.

CEN standard EN 15804 served as the core PCR	
PCR	PCR 2019:14 Construction Products, Version 1.11, 2021-02-05 Complementary Product Category Rules (C-PCR-001) to PCR 2019:14 Cement and Building Lime (EN 16908), Version 2022-05-18
PCR review was conducted by	The Technical Committee of the International EPD® System. Chair: Claudia A. Peña. Contact via info@environdec.com
Independent verification of the declaration and data, according to ISO 14025	☐ EPD process certification (Internal) ☒ EPD verification (External)
Procedure for follow-up of data during EPD validity involved third-party verifier	☐ No ☒ Yes

About Boral

Boral is the largest integrated construction materials company in Australia, with a leading position underpinned by strategically located quarry reserves and an extensive network of operating sites. We also manufacture and supply a range of building products.

Boral Cement manufactures and supplies a wide range of cementitious products used by the building and construction industries of Australia. These products include both 'bulk' and 'bagged' cements, cement blends, and dry mixes with a variety of applications. We also produce a range of limestone and lime products.

Boral Cement supplies Cementitious and Supplementary Cementitious Materials (Ground Granulated Blast Furnace Slag (GGBFS) and fly ash) used by all segments of the construction industry including infrastructure, social, commercial and residential construction. We also ship the intermediate product clinker to customers and within the cement operating sites.

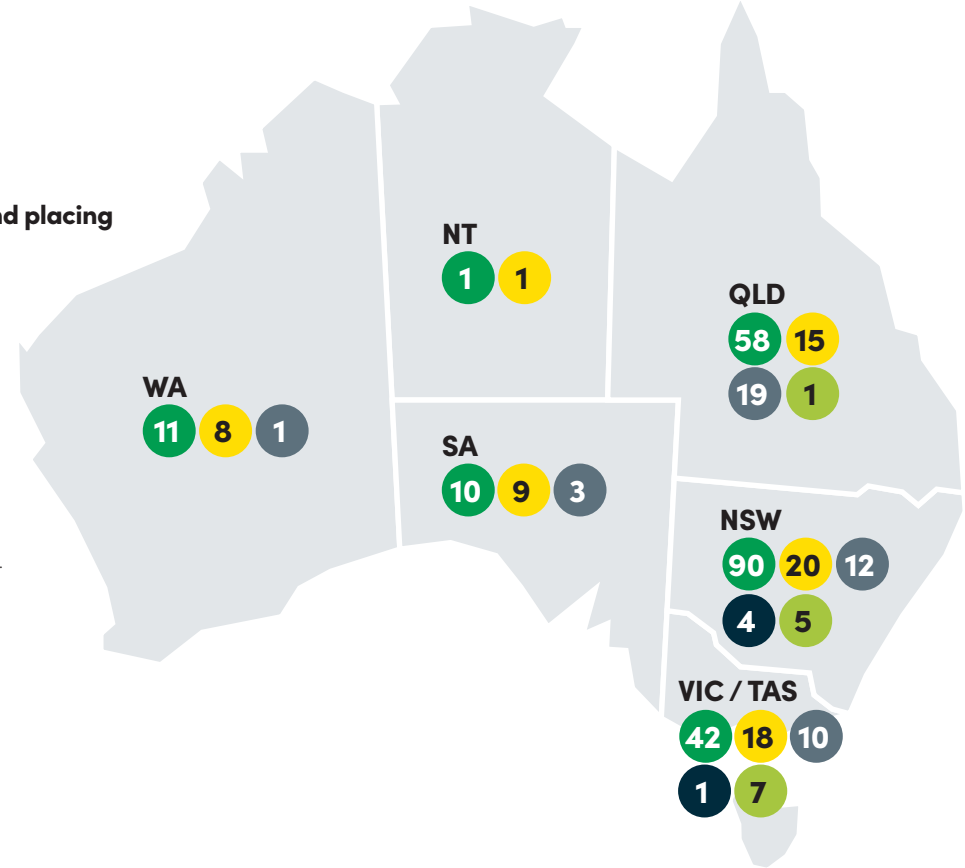
This EPD covers the Bulk cement and cementitious products for the VIC region. Boral Cement has also published EPDs for bulk cement and cementitious products pr oduced in NSW, and lime and limestone products.

Construction materials
Leading integrated network

346
Operating sites*

- 212 **Concrete and placing**
- 71 **Quarries**
- 45 **Asphalt**
- 5 **Cement**
- 13 **Recycling**

* Includes transport, fly ash and research and development sites.



About Boral

ZERO HARM TODAY

How we work

At Boral, we have a culture of 'working together' with a focus on Zero Harm Today. Our first and foremost priority is the health and safety of our people, and all those whom we interact with through our operations. Our key focus is to strengthen the prevention of serious harm through more standardised and tailored controls that identify and mitigate our critical risks.

Boral has a team of full-time Health, Safety , Environment and Quality specialists who operate across our integrated business, offering a single interface for safety communications and innovation across raw materials, logistics, operations and placement.

Innovation and technical capability

The Innovation Factory is Boral's in-house centre of excellence responsible for developing advanced cement and concrete solutions for our customers. Through consultation with our customers, the Innovation Factory is central to enabling transformation through innovative products at Boral.

Our focus on engagement and action is backed by intensive research and development through our dedicated and talented team who work in collaboration with many sections of the company to create a world of future generations will be proud of.

About Boral

Technical services

As one of Australia's largest construction materials companies, Boral is committed to excellence, providing customers with quality products and reliable service. Our aim is to provide products backed up by specialised testing as well as extensive quality control testing and technical support.

To ensure we remain at the forefront, we constantly improve, develop and refine our products to maintain the high standards customers have come to expect.

Our production, technical and quality managers are committed to quality excellence in our manufacturing process. We have committed additional resources to research and we strive to develop whole-of-life solutions that offer a sustainable future. Our innovative products are designed in collaboration with our clients.

Not only are we the only Australian construction materials company to maintain a full-service construction materials laboratory in Australia, Boral Materials Technical Services is also the largest facility of its kind in the country, providing special and standard testing and product development services to Boral and our customers.

Boral maintains an ISO 9001-certified Quality System to ensure we conduct a regular regime of physical properties testing on all materials to certify they:

- meet Australian Standards in the civil and structural construction industry
- comply with applicable legislation, regulations and industry standards
- meet project specifications
- allow for continuous improvement.

Boral laboratory facilities have a quality management system that meets international standards and they are NATA-accredited for construction materials testing and chemical testing. These customer-focused services have earned Boral the reputation of a market leader in its approach.

> " **Boral Materials Technical Services** is also the largest facility of its kind in the country. "

About Boral

Sustainability at Boral

At Boral, we recognise that as a leading Australian construction materials company, we have a unique opportunity and responsibility to do things right.

We are committed to leading the way in sustainability and creating a world that future generations will be proud of.

Our Sustainability Framework sets out our commitments to achieving this across four focus areas:

- **Our people**
- **Our operations**
- **Our products**
- **Our performance.**

Our people

Engaged and proud of our progress

- Health, safety and wellbeing.
- Culture, engagement, diversity and inclusion.
- Employee attraction and development.
- Workplace relations.

Our operations

Responsibly meeting today's and tomorrow's needs

- Decarbonisation pathway.
- Climate resilience.
- Sustainable operations footprint.
- Customer experience and satisfaction.
- Sustainable procurement.
- Community relations and partnerships.

Four focus areas

Our performance

Delivering sustainable financial outcomes

- Short- and long-term business plans, continuous improvement and financial results
- Capital allocation and capital management.

Our products

Making a lasting positive impact

- Lower carbon products.
- Recycled products.
- Sustainable infrastructure and services.
- Product stewardship.
- Innovation, technology and digital disruption.

About Boral

ZERO HARM TODAY

Our commitment

Our overarching goal is to deliver Zero Harm Today. This means we target zero injuries to our people and seek to eliminate adverse environmental impacts. Where elimination is not possible, we seek to minimise any harmful effects from our operations. At an absolute minimum, this means complying with environmental legislation, regulations, standards and codes of practice.

- **Reducing greenhouse gas** emissions from our processes, operations and facilities.
- **Reducing waste** in all forms including through the efficient use of energy, conservation of water, minimising and recycling waste materials and energy, prevention of pollution, and effective use of virgin and recovered resources and supplemental materials.
- **Protecting biodiversity** values at and around our facilities.
- **Openly and constructively engaging** with communities surrounding our operations.

Geographical scope

Vic region

The Cement manufacturing sites considered for this Environmental Product Declaration comprise those operated by Boral in Victoria, namely the Geelong North Shore cement grinding facility.

Legend

Plants that are being modelled in VIC region EPD.

Boral Clinker Facility, Geelong, VIC

Declared products

Products considered for the VIC region Environmental Product Declaration

Geelong Grinding Facility — Bulk Products

General Purpose (GP) Cement:
General Purpose Cement is a special purpose cement complying with AS 3972, type GP. It is manufactured from specially prepared Portland Cement clinker and gypsum.

General Purpose Cement may contain up to 7.5 percent of AS 3972 approved additions.

High Early Strength (HES) Cement:
High Early Strength Cement is a special purpose cement complying with AS 3972, type HE. It is manufactured from specially prepared Portland cement clinker and gypsum. It does not contain any approved additions. Early Strength Cement is more finely ground than General Purpose Cement.

Enviroment® Slag Cement:
ENVIROMENT® is a Ground Granulated Blast Furnace Slag which complies with AS3582.2 as a supplementary cementitious material. It can be used as a partial Portland cement replacement to enhance the durability characteristics of concrete.

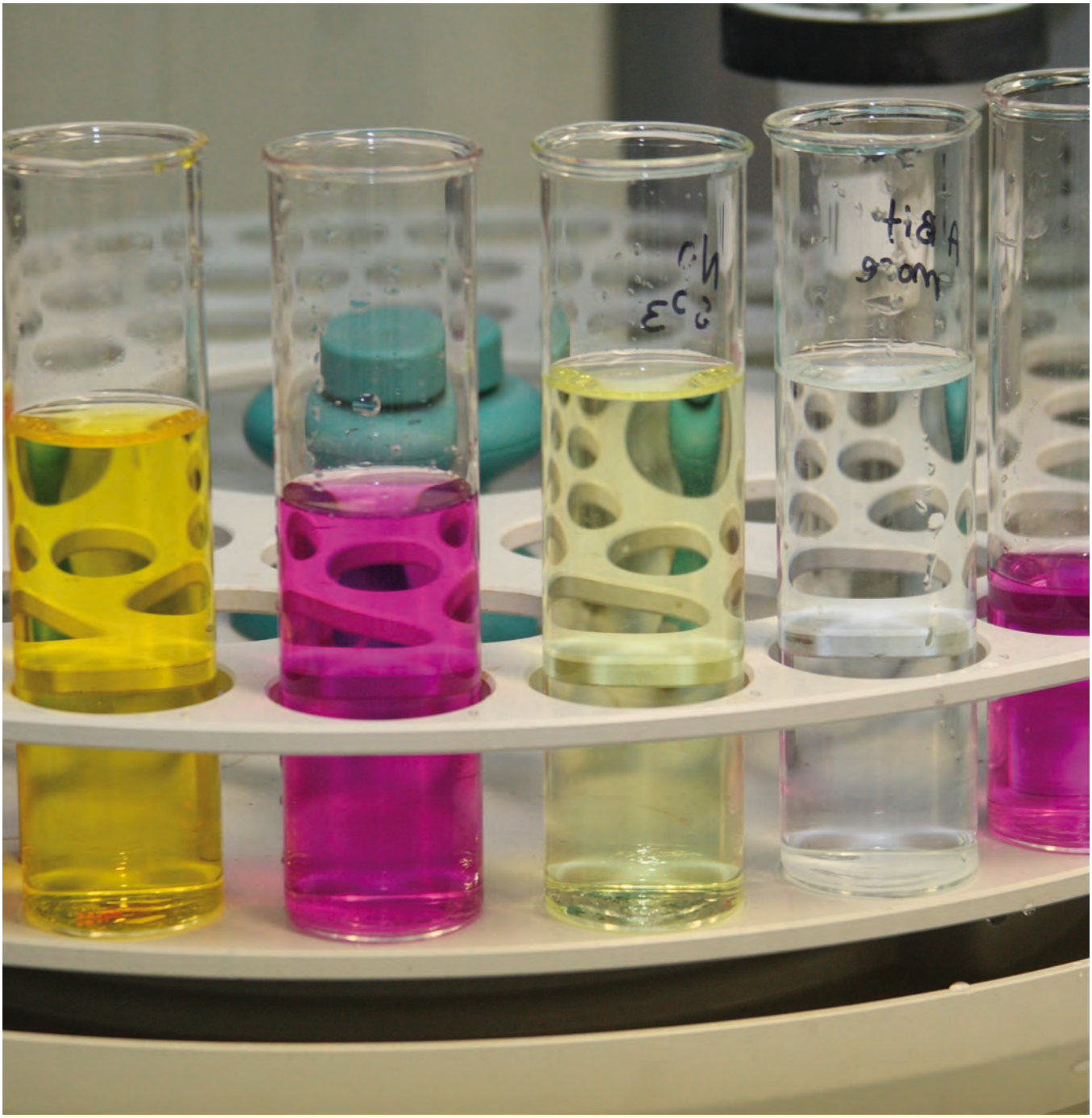
Cement production

Technical and functional characteristics

The products' intended uses are in a wide range of building and construction applications. Further details on product use and design for different applications can be found on Boral's website, see **www.boral.com.au/products/cement-and-lime**

The product codes for cement products are UN CPC 374 (Plaster, lime and cement) and ANZSIC 20310 (cement manufacturing).

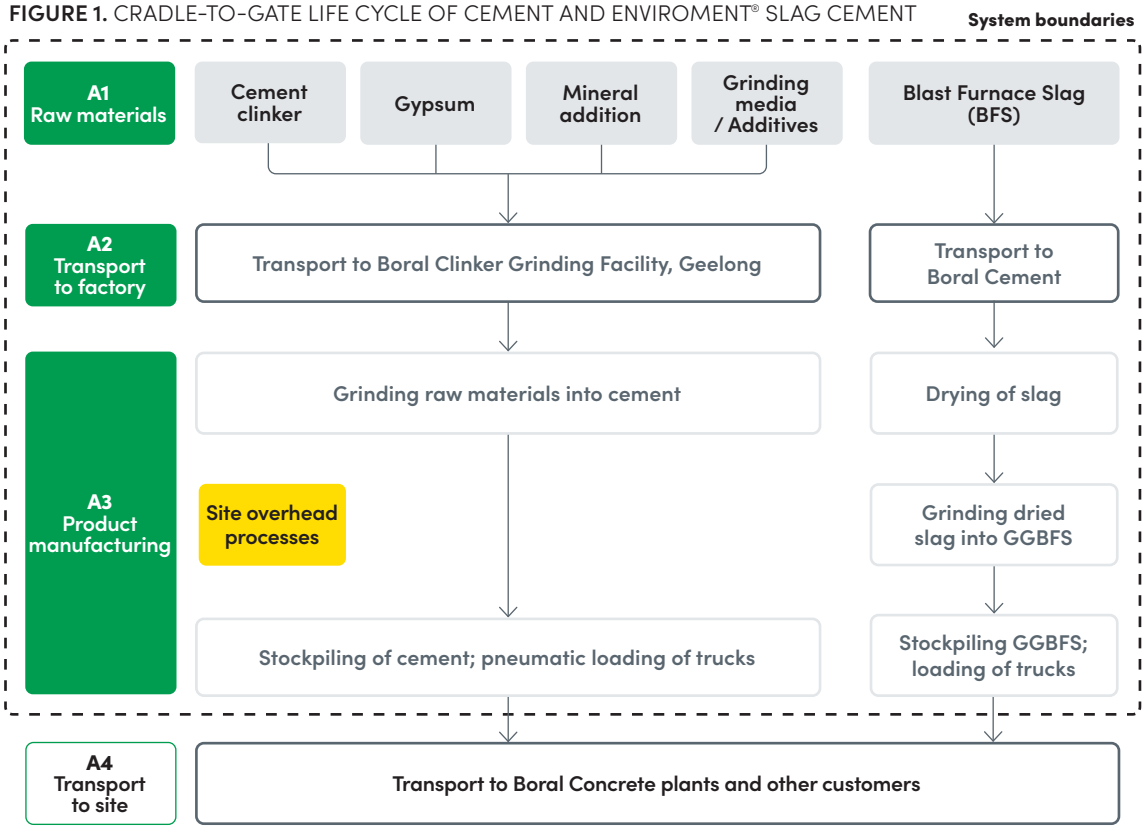
Boral Cement operates a Quality Management System certified to ISO 9001:2015 for its operations.



Cradle-to-gate life cycle

This EPD covers the cradle-to-gate life cycle stages (A1-A3), as per the diagram below. Downstream stages have not been included, as these are best defined at the final material and project level. For example, Concrete EPDs (according to EN 15804+A2) contain scenarios that cover the end-of-life of concrete, including the cementitious materials that were used in the concrete.

FIGURE 1. CRADLE-TO-GATE LIFE CYCLE OF CEMENT AND ENVIROMENT® SLAG CEMENT



Raw material stage (A1)

The main raw material inputs to produce our cementitious materials are clinker, gypsum, mineral addition (limestone) and slag.

The cement milling process also uses grinding media (steel balls) and grinding aids (organic compounds) in small quantities. The grinding aids come from local suppliers.

Transportation stage (A2)

Clinker, slag granulate and gypsum arrive by ship, are offloaded to our adjacent wharf and then conveyed into a storage area on site. Limestone is transported to site by articulated trucks.

The Geelong facility imports raw materials to produce its products. Clinker for producing the GP and HES cements comes from two sources in Indonesia and Japan, whereas slag granulate comes from Japan. Gypsum is supplied from a mine in South Australia and limestone mineral addition from a local mine near Geelong.

Cradle-to-gate life cycle

Manufacturing stage (A3)

The Geelong facility was newly commissioned in 2022 and forms a strategic hub for the supply of crucial building and construction materials into the Melbourne metropolitan area.

Boral produces cement (GP and HES) and ENVIROMENT® Slag Cement (GGBFS) at the Geelong milling facility.

The clinkers are mixed with gypsum and limestone mineral addition into one of two cement mills, where it is crushed to produce cement. Some cements also add limestone at the milling stage as a mineral addition. All products use grinding aids to improve the performance of the finished product.

It is then fed into cement silos from where it is dispatched by road tanker for delivery to Boral Cement's customers (internal Boral customers or external). Slag granulate is dried on site then fed into the same mills and ground into the finished product.

TABLE 1. SCOPE OF EPD

	Product stage			Construction stage		Use stage							End-of-life stage				Benefits beyond system boundary
	RAW MATERIAL SUPPLY	TRANSPORT	MANUFACTURING	TRANSPORT	CONSTRUCTION-INSTALLATION PROCESS	USE	MAINTENANCE	REPAIR	REPLACEMENT	REFURBISHMENT	OPERATIONAL ENERGY USE	OPERATIONAL WATER USE	DECONSTRUCTION DEMOLITION	TRANSPORT	WASTE PROCESSING	DISPOSAL	REUSE, RECOVERY, RECYCLING POTENTIAL
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
				Scenario		**Scenario**							**Scenario**				
Modules declared	✔	✔	✔	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Geography	AU, JP / ID	AU	AU														
Specific data used	10% (Cement) 90% (GGBFS)																
Variation — Products	0%																
Variation — Sites	0%																

✔ = module is included in this study ND = module is not declared*

* When a module is not accounted for, the stage is marked with "ND" (Not Declared). ND is used when we cannot define a typical scenario.

Life Cycle Assessment (LCA) methodology

Background data

As our Geelong operations have only come online recently, Boral has supplied primary data for the milling process from our other cement and slag production facilities in NSW (Berrima and Maldon). Our Geelong site provided primary data regarding the product compositions, as well as details for our clinker, slag, limestone and gypsum suppliers.

Background data for raw materials (clinker, limestone, gypsum, blast furnace slag, grinding media and grinding aids), as well as energy and transport processes, have predominantly been sourced from AusLCI and the AusLCI shadow database (AusLCI 2021).

The NSW cement production data that have been used were collected for financial year 2020 (1 July 2019 to 30 June 2020). The NSW slag milling data that have been used were collected for financial year 2022 (1 July 2021 to 30 June 2022). The product compositions and supply chain detail are based on current (2022) Geelong data. The environmental profiles of our products are based on life cycle data that are less than five years old. Background data used is less than 10 years old.

Methodological choices have been applied in line with EN 15804: deviations have been recorded.

Allocation

The key production processes that require allocation are:

- **Cementitious binders:** Electricity use (based on data from Berrima and Maldon) is allocated to each cementitious product based on actual electricity use of the grinding processes.
- **BFS:** blast furnace slag (BFS) is a by-product from steelmaking. We have used the AusLCI data for BFS ('blast furnace slag allocation, at steel plant / AU U'), which contain impacts from pig iron production allocated to blast furnace slag. As drying and grinding of BFS occurs at our Geelong site, we have used energy data for these processes based on similar data from Maldon, rather than the default AusLCI data.

Cut-off criteria

- The contribution of capital goods (production equipment and infrastructure) and personnel is excluded, because they are non-attributable processes and contribute less than 10 percent to the GWP-GHG.
- The packaging used for grinding media and grinding aids is well below the materiality cut-off and these materials have been excluded.

Key assumptions

- Clinker sourced from third parties is based on AusLCI data for Australian clinker production and AusLCI data for imported clinkers from Japan and Indonesia. The AusLCI data have been adjusted where more specific information from suppliers was available. Compared to high-level greenhouse gas values provided by our suppliers, we have used a conservative approach that allows us to report on all environmental indicators required by EN 15804.
- Blast furnace slag receives some environmental impacts from pig iron production. This allocation decision has an effect on the environmental profile of ENVIROMENT® cement.
- Blast furnace slag has been considered a by-product of steel manufacturing, and therefore is not counted towards the Secondary Materials (SM) parameter.
- Electricity has been modelled for core processes using the AusLCI data for the electricity mix used in the Victorian market. The GWP-GHG intensity of the electricity is aligned with the National Greenhouse Accounts (NGA) 2022 factor: 0.92 kg CO_2e / kWh.

Product composition

The nominal product composition of the cement products included in this EPD is presented in the following table.

TABLE 2. CEMENT PRODUCT COMPOSITIONS (VIC REGION)

Constituent (in kg per tonne)	IMPORTED CLINKER	GYPSUM	MINERAL ADDITION (LIMESTONE)	DRIED BLAST FURNACE SLAG	TOTAL	POST-CONSUMER MATERIAL (% WEIGHT)	RENEWABLE MATERIAL (% WEIGHT)
General Purpose Cement (GP)	900	50	50	-	**1,000**	0%	0%
High Early Strength Cement (HES)	950	50	-	-	**1,000**	0%	0%
ENVIROMENT® Slag Cement (GGBFS)	-	-	-	1,000	**1,000**	0%	0%

The products as supplied are non-hazardous. The products included in this EPD do not contain any substances of very high concern as defined by European REACH regulation in concentrations > 0.1% (m/m).

Hexavalent Chromium Cr (VI) (CAS 1333-82-0) can be present as a trace element in cement (<50ppm)

Declared unit

Declared unit is 1000 kg (1 tonne) of cementitious material.

Environmental indicators

TABLE 3. EN15804+A2 CORE IMPACT CATEGORIES INCLUDED IN THIS ASSESSMENT

Impact category	Acronym	Unit
Global warming potential — Total	**GWP-total**	kg CO_2 equivalents
Global warming potential — Fossil	**GWP-fossil**	kg CO_2 equivalents
Global warming potential — Biogenic	**GWP-biogenic**	kg CO_2 equivalents
Global warming potential — Land use and land use change	**GWP-luluc**	kg CO_2 equivalents
Depletion potential of the stratospheric ozone layer	**ODP**	kg CFC-11 equivalents
Acidification potential and accumulated exceedance	**AP**	mol H^+ equivalents
Eutrophication potential and aquatic freshwater	**EP-freshwater**	kg P equivalents
Eutrophication potential and aquatic marine	**EP-marine**	kg N equivalents
Eutrophication potential and terrestrial	**EP-terrestrial**	mol N equivalents
Photochemical ozone formation potential	**POCP**	kg NMVOC equivalents
Abiotic depletion potential for non-fossil resources*	**ADP-minerals and metals**	kg Sb equivalents
Abiotic depletion potential for fossil resources*	**ADP-fossils**	MJ
Water (user) deprivation potential*	**WDP**	m^3 world equivalent deprived

TABLE 4. EN15804+A2 ADDITIONAL IMPACT CATEGORIES INCLUDED IN THIS ASSESSMENT

Impact category	Acronym	Unit
Global warming potential — climate impact#	**GWP-GHG**	kg CO_2 equivalents
Particulate matter emissions	**PM**	Disease incidence
Ionizing radiation and human health**	**IRP**	kBq U235 equivalents
Eco-toxicity — Freshwater*	**ETP-fw**	CTUe
Human toxicity potential, cancer*	**HTP-c**	CTUh
Human toxicity potential, non-cancer*	**HTP-nc**	CTUh
Land use related impacts / Soil quality*	**SQP**	-

* 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 experience with the indicator.

** 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.

The GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). This indicator is determined using the IPCC AR5 Global Warming Potentials (GWP) with a 100-year time horizon.

Environmental indicators

TABLE 5. PARAMETERS DESCRIBING RESOURCE USE, WASTE AND OUTPUT FLOWS

Resource use	Acronym	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	**PERE**	MJ_{NCV}
Use of renewable primary energy resources used as raw materials	**PERM**	MJ_{NCV}
Total use of renewable primary energy resources	**PERT**	MJ_{NCV}
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	**PENRE**	MJ_{NCV}
Use of non-renewable primary energy resources used as raw materials	**PENRM**	MJ_{NCV}
Total use of non-renewable primary energy resources	**PENRT**	MJ_{NCV}
Use of secondary material	**SM**	kg
Use of renewable secondary fuels	**RSF**	MJ_{NCV}
Use of non-renewable secondary fuels	**NRSF**	MJ_{NCV}
Use of net fresh water	**FW**	m^3
Waste categories		
Hazardous waste disposed	**HWD**	kg
Non-hazardous waste disposed	**NHWD**	kg
Radioactive waste disposed	**RWD**	kg
Output flows		
Components for re-use	**CRU**	kg
Materials for recycling	**MFR**	kg
Materials for energy recovery	**MER**	kg
Exported energy	**EE**	MJ

TABLE 6. EN 15804+A1 IMPACT CATEGORIES INCLUDED IN THIS ASSESSMENT

Impact category	Acronym	Unit
Global Warming Potential	**GWP**	kg CO_2 equivalents
Ozone Depletion Potential	**ODP**	kg CFC-11 equivalents
Acidification Potential of Soil and Water	**AP**	kg SO_2 equivalents
Eutrophication Potential	**EP**	kg PO_4^{3-} equivalents
Photochemical Ozone Creation Potential	**POCP**	kg C_2H_4 equivalents
Abiotic Depletion Potential for Mineral Elements	**ADPE**	kg Sb equivalents
Abiotic Depletion Potential for Fossil Fuels	**ADPF**	MJ

Environmental profiles

The cradle-to-gate (module A1-A3) environmental profiles and environmental parameters of each product are expressed per declared unit (1000 kg [1 tonne] of cement or ENVIROMENT® Slag Cement.

The environmental parameters are based on the life cycle inventory. There can be some ambiguity around their presentation, and this should be considered when comparing EPDs.

Limitations

The results use characterisation methods and models as specified in EN15804:2012+A2:2019 and may not be comparable to EPDs following different standards, characterisation methods or models.

The main limitations of the LCA are due to the lack of verifiable supplier data, which means we used more conservative AusLCI data for clinker production.

The results of this study and the EPD are valid for Boral products produced in Victoria only. Products from other manufacturers in other states will likely have different impacts due to differences in product compositions, supply chains and manufacturing processes.

This EPD contains three versions of climate change indicators:

1. **The Climate change total indicator** (Table 7)
   Aligns with the EN 15804+A2 default method. It is based on a European implementation of Global Warming Potentials, that doesn't fully align with Australian reporting frameworks.
2. **The Carbon footprint (GWP-GHG) indicator** (Table 8)
   Includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR5 (IPCC 2013). This indicator is determined using IPCC AR5 Global Warming Potentials (GWP) with a 100-year time horizon. It aligns with current Australian greenhouse gas reporting frameworks (e.g. National Greenhouse and Energy Reporting (NGER) framework).
3. **The GWP indicator** (Table 9)
   Aligns with the EN 15804+A1 default method. This indicator is determined using IPCC AR4 Global Warming Potentials (GWP) with a 100-year time horizon. It aligns with some of the tools that are currently used in Australia (e.g. ISC Materials Calculator).

Environmental profiles

TABLE 7. EN 15804+A2 IMPACT CATEGORIES, STAGES A1-A3, (VIC REGION) PER TONNE

Indicator	Unit	ENIROMENT® SLAG CEMENT	GENERAL PURPOSE (GP) CEMENT	HIGH EARLY STRENGTH (HES) CEMENT
Climate change — Total	kg CO_2-eq.	1.90E+02	9.84E+02	1.06E+03
Climate change — Fossil	kg CO_2-eq.	1.90E+02	9.84E+02	1.06E+03
Climate change — Biogenic	kg CO_2-eq.	2.74E-01	3.52E-01	4.32E-01
Climate change — Land use and land use change	kg CO_2-eq.	3.05E-05	4.92E-02	5.19E-02
Ozone depletion	kg CFC11-eq.	8.60E-06	9.91E-06	1.03E-05
Acidification	mol H+-eq.	2.74E+00	4.14E+00	4.56E+00
Eutrophication aquatic freshwater	kg P eq.	1.56E-04	6.05E-03	6.41E-03
Eutrophication aquatic marine	kg N eq.	2.57E-01	1.13E+00	1.20E+00
Eutrophication terrestrial	mol N eq.	2.86E+00	1.27E+01	1.36E+01
Photochemical ozone formation	kg NMVOC eq.	8.15E-01	3.04E+00	3.25E+00
Depletion of abiotic resources — Minerals and metals	kg Sb eq.	4.13E-06	3.94E-06	4.00E-06
Depletion of abiotic resources — Fossil fuels	MJ (NCV)	2.32E+03	5.61E+03	6.15E+03
Water use	m^3 world eq. deprived	4.52E+02	6.02E+03	6.41E+03

TABLE 8. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES, STAGES A1-A3, (VIC REGION) PER TONNE

Indicator	Unit	ENVIROMENT® SLAG CEMENT	GENERAL PURPOSE (GP) CEMENT	HIGH EARLY STRENGTH (HES) CEMENT
Particulate Matter emissions	Disease incidence	1.42E-05	1.76E-05	2.08E-05
Ionizing radiation, human health	kBq U235 eq.	3.48E-03	5.18E+00	5.47E+00
Eco-toxicity (freshwater)	CTUe	6.50E+02	4.05E+03	4.28E+03
Human toxicity, cancer effects	CTUh	1.90E-08	7.67E-08	8.14E-08
Human toxicity, non-cancer effects	CTUh	1.30E-06	4.44E-06	4.76E-06
Land use related impacts / Soil quality	–	1.93E+02	1.84E+02	2.34E+02
Carbon footprint (IPCC AR5, 100 yr)	kg CO_2-eq.	189	979	1,050

Environmental profiles

TABLE 9. ENVIRONMENTAL PARAMETERS, STAGES A1-A3, (VIC REGION) PER TONNE

Parameter	Unit	ENVIROMENT® SLAG CEMENT	GENERAL PURPOSE (GP) CEMENT	HIGH EARLY STRENGTH (HES) CEMENT
PERE	MJ_{NCV}	5.71E+01	5.61E+01	7.23E+01
PERM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
PERT	MJ_{NCV}	5.71E+01	5.61E+01	7.23E+01
PENRE	MJ_{NCV}	2.32E+03	5.62E+03	6.15E+03
PENRM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ_{NCV}	2.32E+03	5.62E+03	6.15E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00
RSF	MJ_{NCV}	0.00E+00	5.27E+01	5.56E+01
NRSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
FW	m^3	4.93E-01	4.31E+00	4.59E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	6.09E-01	1.45E-01	2.04E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00

TABLE 10. EN 15804+A1 IMPACT CATEGORIES, STAGES A1-A3, (VIC REGION) PER TONNE

Indicator	Unit	ENVIROMENT® SLAG CEMENT	GENERAL PURPOSE (GP) CEMENT	HIGH EARLY STRENGTH (HES) CEMENT
Global warming	**kg CO_2 eq**	**1.88E+02**	**9.77E+02**	**1.05E+03**
Ozone depletion	kg CFC11 eq	6.80E-06	8.04E-06	8.39E-06
Acidification	kg SO_2 eq	1.55E+00	2.85E+00	3.03E+00
Eutrophication	kg PO_4^{3-} eq	8.98E-02	4.08E-01	4.35E-01
Photochemical oxidation	kg C_2H_4 eq	8.11E-02	1.21E-01	1.28E-01
Abiotic depletion (minerals)	kg Sb eq	4.13E-06	4.30E-06	4.39E-06
Abiotic depletion (fossil fuels)	MJ	2.30E+03	5.63E+03	6.17E+03

Our approach to climate related risks

Our approach

Boral recognises that climate related physical risks and a global transition to a lower-carbon future are expected to impact our operations, customers and suppliers. We support the Paris Agreement and mechanisms to achieve its objective of limiting future average global temperature rises to well below 2°C, as well as Australia's 2030 target of a 26–28% reduction in carbon emissions below 2005 levels.

Looking at how Boral's carbon emissions are tracking relative to 2005 levels, in Australia we have reduced emissions by around 40% since FY2005. We achieved about half of this decrease largely by realigning our portfolio away from emissions-intensive businesses. The remainder of the decrease is due to reducing clinker manufacturing in Australia in favour of importing it from more efficient and larger scale operations in Asia. Including Boral North America, our Scope 1 and 2 emissions decreased by 43% since FY2005.

We continue to progressively adopt the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). In FY2019, we enhanced our climate-related governance and risk management, completed scenario analysis of Boral Cement's business and continued to strengthen our resilience to a 2°C scenario. We also broadened our reporting of physical climate-related risks and Scope 3 emissions.

We completed a Group-wide review of our climate-related risks and opportunities using the TCFD framework. This review informed a two-year roadmap to undertake further scenario analysis of key climate related business risks. We transparently and constructively engaged with Climate Action 100+ investor representatives and other stakeholders during the year, sharing our progress in aligning our efforts with the TCFD recommendations and building greater resilience to climate-related impacts.

Our approach to climate related risks

Energy and climate policy

Boral has not identified any major positions on energy and climate policy held by our industry associations that are materially inconsistent with Boral's position.

We support:

- **A national approach to climate and energy policy** to ensure that least-cost carbon emissions abatement is targeted while ensuring reliable and competitive energy can be delivered.
- **Climate and energy policies** that do not unduly erode the competitiveness of domestic based businesses.

Through our community partnership with Conservation Volunteers Australia, we support conservation and education initiatives in our local communities, including native vegetation initiatives in local reserves and schools.

In Australia, we are a member of the Cement Industry Federation (CIF). The CIF policy is to support the Federal Government's national target to reduce emissions by 26–28 percent by 2030, and the CIF has been working with the World Business Council for Sustainable Development and its current roadmap to reduce emissions.

Boral acknowledges the Paris Agreement and supports mechanisms to achieve its objectives, including a national approach to climate and energy policy. Boral's major industry associations are:

- Cement Industry Federation (CIF)
- Australian Flexible Pavement Association (AfPA)
- American Coal ash Association (ACAA)

For more information visit **boral.com/industry associations**

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A Safety Data Sheet is available on the Boral website or by contacting Boral customer service. Images in this brochure are only representative of Boral products and the appearance and effect that may be achieved by their use. Particular projects may require the use of specific construction techniques or products. Boral recommends obtaining technical advice prior to construction.
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