GB Masonry Range

Environmental Product Declaration
in accordance with ISO 14025 and EN 15804+A1

Programme operator: EPD Australasia Ltd
EPD registration number: S-P-05476 (version 1.1)
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Valid until: 2027-02-28
Geographical scope: Australia

austral masonry®

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

ECO PLATFORM EPD VERIFIED

GB Masonry Range
Assessment

Prepared in accordance with ISO 14025 and EN 15804 for:

Concrete Masonry Blocks produced by Austral Masonry in Gympie, QLD

Version:	1.1
Revision Date:	28 June 2022 (Valid until 28 February 2027)
Geographical Scope:	Queensland, Australia

Version	Differences versus previous versions
1.1	The content declaration in version 1.0 contains errors that have been corrected in this version. There are no changes to the environmental results.

The Company

Brickworks has been transformed from originally a New South Wales state-based operation to a national organisation with manufacturing operations in NSW, Victoria, Tasmania, South Australia, Western Australia and Queensland. Austral Masonry is a subsidiary of Brickworks. Austral Masonry manufactures a collection of coloured and grey masonry blocks, pavers, concrete sleepers and retaining wall blocks used in residential and commercial construction. By adding oxides and coloured sands to our mix of raw materials, we produce products with contemporary colours, textures and appeal. The business has manufacturing operations in Queensland, New South Wales, and Perth with staffed sales offices in all states (not in Northern Territory).

The GB Masonry coloured masonry block collection from Austral Masonry offers masonry-style inspired by design. From refined honed and polished products to bold rustic finishes, this collection offers a range of products that epitomise style and have become a hallmark of contemporary architectural design. This range has gained a strong architectural following thanks to the inspired coloured palette, textures and product customisation options available to suit increasingly creative designs developed by project specifiers.

Made at our Gympie production facility and available from Brickworks locations across the country, GB Masonry products are made with outstanding attention to detail and craftsmanship which has set a new standard in style for the humble concrete block.

More information:

brickworks.com.au

australmasonry.com.au

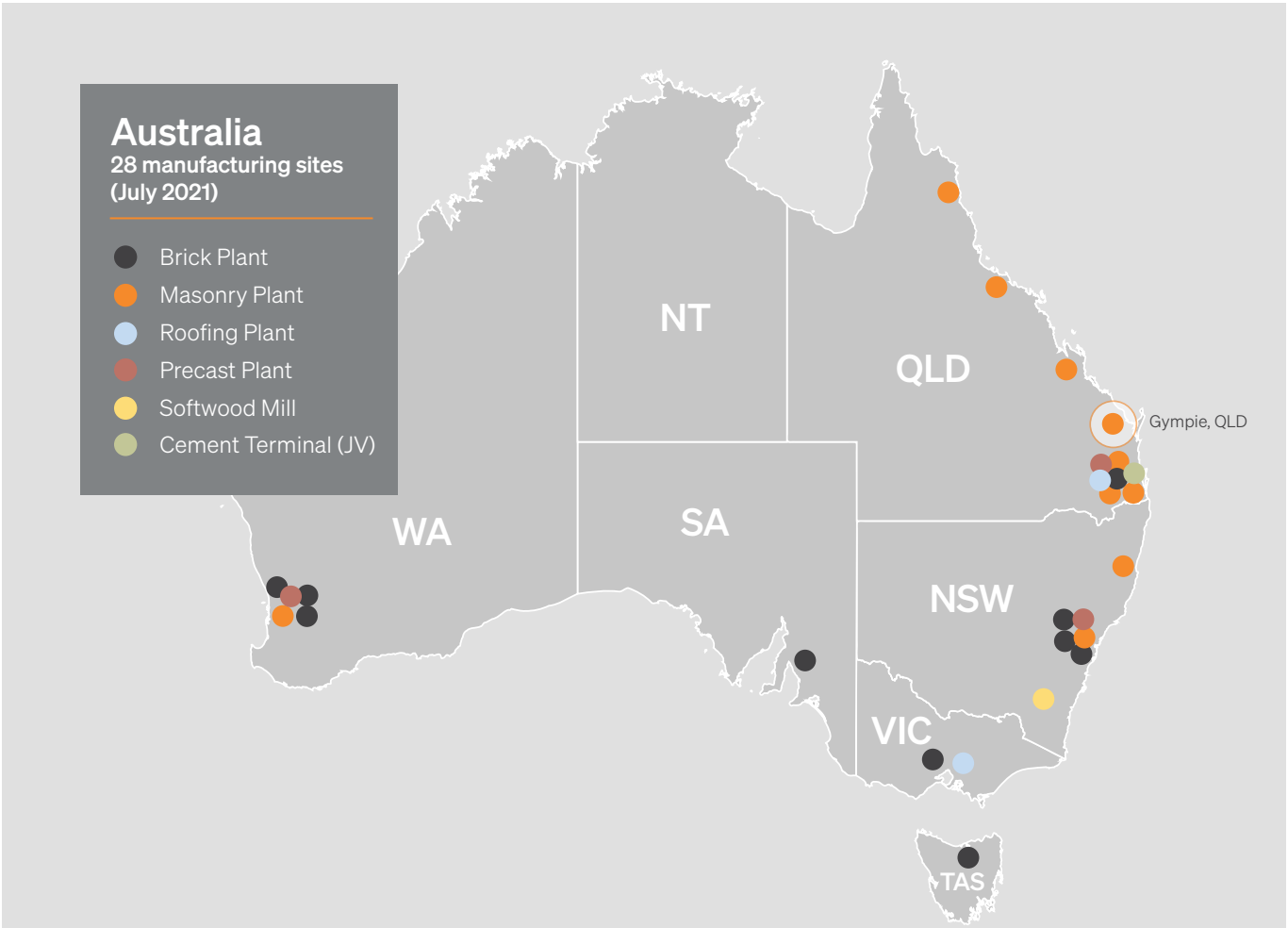


Figure 1: Location of Austral Masonry's concrete block production facility

The GB Masonry collection is made at our plant located at the corner of Woondum Rd & Bruce Highway, Gympie QLD 4570.

At this site Austral Masonry manufactures coloured masonry blocks and interlocking retaining wall blocks with distribution across the country:

1. Coloured Masonry Blocks: made from concrete in a range of colours, textures, sizes and formats to suit load bearing and non load bearing applications in residential and commercial construction.

2. Retaining Wall Blocks: concrete blocks with a mortarless interlock, meaning the blocks have been designed to interlink with one another when laid. These blocks are commonly used in residential and commercial retaining wall applications.

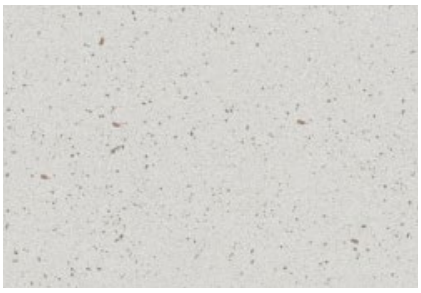
Concrete Masonry blocks are used for a number of reasons:

- **Applications** - Suitable for load bearing and non-loadbearing applications.
- **Offer structure and aesthetic finish in one product** - meaning less materials can be used to create a finished wall than some competing wall systems that require multiple layers of products/finishes.
- **Durability** – concrete is strong and dense with ability to withstand heavy impact
- **Long lasting** – concrete structures have long design life.
- **Low maintenance** – concrete products generally require minimal if any upkeep.
- **Fire resistant** – concrete is non-combustible, so ideal for use in bushfire prone areas.

Examples of our Products

Coloured Masonry Blocks Finishes – available in a range of colours

GB Aspect



GB Honed

GB Smooth

Vertico Split Face

GB Split Face

Rock Face

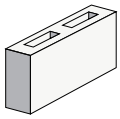
Veneer Sawn Face

Veneer Split Face

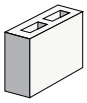
Each block finish is available in a range of sizes and formats designed to suit specific applications – the example shown is the GB Smooth sizes and format options:

GB Smooth Sizes and Formats

10-01 Standard Unit
390L x 90W x 190H mm

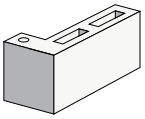


10-02 Three Quarter
290L × 90W × 190H mm



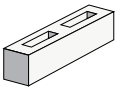
10-03 Half
190L × 90W × 190H mm

10-25 Corner Return
390L × 190W × 90H mm



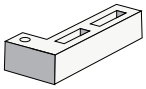
10.38 Half Height Sill
130L × 190W × 90H mm

10-71 Half Height
390L x 90W x 190H mm

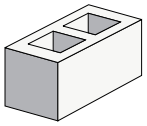


10-73 Half Heigh Half
90L × 90W × 90H mm

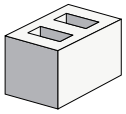
10-725 Half Height Corner Return
190L × 90W × 190H mm



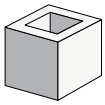
20-01 Standard
390L × 190W × 190H mm



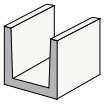
20-02 Three Quarter
390L × 190W × 190H mm



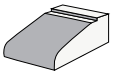
20-03 Half
90L x 90W x 90H mm



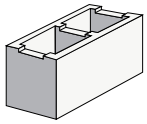
20-13 Half Lintel
190L × 190W × 190H mm



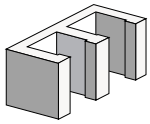
20-38 Half Height Sill
245L × 190W × 100H mm



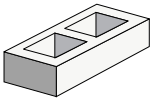
20-42 Channel
390L × 190W × 190H mm



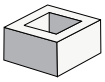
20-45 Clean Out Block
390L × 190W × 190H mm



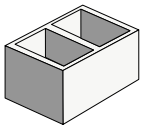
20-71 Half Height
90L x 90W x 90H mm



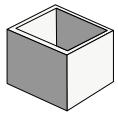
20-73 Half Lintel
190L × 190W × 90H mm



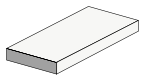
30-01 Full
390L × 290W × 190H mm



30-02 Three Quarter
390L × 290W × 190H mm



50-31 Capping Tile
390L × 190W × 40H mm



Breeze Blocks Finishes – available in a range of colours

Breeze Block Finishes

Arc Breeze
Size: 180 × 190 × 390mm

Cloud Breeze
Size: 90 × 190 × 390mm

Diamond Breeze
Size: 140 × 190 × 390mm

Wedge Breeze
Size: 140 × 190 × 390mm

Flower Breeze
Size: 90 × 290 × 290mm

Circle Breeze
Size: 90 × 290 × 290mm

Linear Breeze
Size: 95 × 90 × 390mm

Retaining Wall Finishes – available in a range of colours

Retaining Wall Finishes

Heron

Hayman

Moreton

Technical Compliance

Internationally, concrete masonry blocks are identified by Central Product Classification code UN CPC 375 (“Concrete”). In Australia, they fall under the ANZSIC 2034 “Concrete Product Manufacturing” product group classification.

Austral Masonry blocks are manufactured to AS/NZS 4455.1:2008 Masonry Units.

Product quality testing is performed in accordance with AS/NZS 4456 Masonry Units and Segmental Pavers – Methods of Test.

Product Life Cycle

Overview

This EPD covers the cradle-to-gate life cycles stages (modules A1-A3). Downstream stages have not been included.

Table 1: Austral Masonry's concrete masonry block products

Product stage			Construction process stage		Use stage							End-of-life stage				Benefits beyond system boundary
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
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
			Scenario		Scenario							Scenario				
✓	✓	✓	MND	MND	MND	MND	MND	MND	MND	NR	NR	MND	MND	MND	MND	MND

✓ = module is included in this study
MND = module is not declared
NR = module is not relevant

Product Stages

Stage A1 – raw material extraction

Concrete masonry products are typically made using cement, fine/coarse aggregates (sand) and water. Admixtures and oxides may be used to achieve desired material properties and colours. To reduce our reliance on virgin materials, we have introduced various recovered materials into our products, such as crushed glass sand, ground granulated blast furnace slag (GGBFS) and bottom ash / middle ash from coal-fired power stations.

The cement we use in Gympie is made overseas (typically Malaysia, Vietnam or Indonesia) and GGBFS is imported from Japan. These materials are shipped to Brisbane, from where they are distributed to Queensland customers, including Austral Masonry Gympie. The aggregates we use (natural sand, crushed glass sand, ash) are sourced from within the region in which we produce concrete masonry blocks.

Stage A2 – transportation

Raw materials are typically transported to Gympie via articulated trucks, except for White Portland cement, General Purpose (GP) cement and GGBFS, which are sourced from overseas and transported by transoceanic freight ship and then articulated trucks.

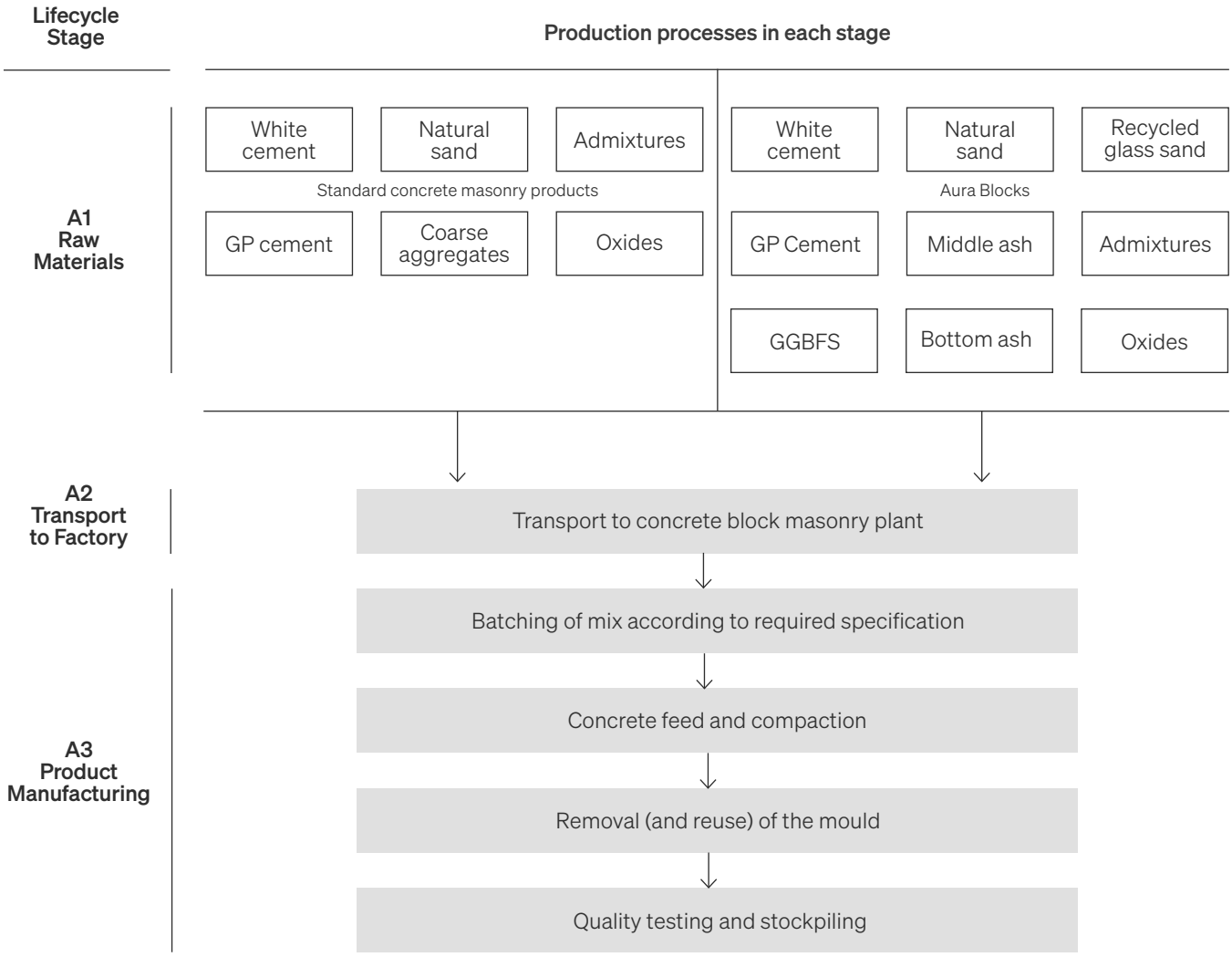
The impact of transportation is determined from the specific supply sources to Austral Masonry's plant in Gympie. It is noted that for admixtures, the supplier location which is known is the location that is used in the analysis.

Internal transport occurring within Austral Masonry's core process is included in stage A3, as fuel use cannot always be separated from other core processes.

Stage A3 – manufacturing

The manufacturing process of Austral Masonry's concrete blocks starts by dosing and mixing the concrete constituents in exact formulations (concrete mix designs). The green concrete is fed into block moulds and compacted. When the concrete has developed enough strength, the mould is removed, cleaned and reused. It is important to note that at our Gympie plant, the concrete does not undergo steam curing. Finally, the products are tested and stockpiled.

Figure 2: Cradle-to-gate life cycle of Austral Masonry concrete blocks



Life Cycle Assessment
Methodology

A background LCA for Austral Masonry's concrete masonry products was conducted by Energetics and serves as the foundation for this EPD. The methodology for the LCA is detailed below.

Primary and Background Data

Austral Masonry supplied primary data for the FY21 (1 July 2020 – 30 June 2021) period. Primary data include production volumes at the Gympie plant, product compositions for all concrete mixes, type and quantity of concrete used for each product group, energy and water consumption and waste data. Austral Masonry also provided information regarding its upstream value chain (raw materials and supply chain logistics data).

Data sets used for calculations have been reviewed and where relevant updated within the last 10 years for generic data and within the last 5 years for producer specific data.

Background data have predominantly been sourced from AusLCI and the AusLCI shadow database (v1.36):

- Cement is known to be the key contributor to environmental impacts of most concrete products. Energetics has adjusted the cement (clinker) production process in line with available information on cement composition (percentage mineral addition in GP cement) and country of origin (using country-specific electricity processes from the ecoinvent v3.7.1 database).
- Aggregate data are based on natural sand production or crushed rock production (for manufactured sand). Some of the sands we use are double washed or triple washed. Energetics doubled or tripled electricity use in the sand production process to account for the additional handling of the material. The effect on the LCA results is minimal.
- Data for admixtures have been sourced from EPDs published in December 2015 by EFCA (European Federation of Concrete Admixtures Associations Ltd.) (EFCA 2015a-b) These EPDs are past their validity date but are nonetheless considered the best available information for concrete admixtures.
- We use various types of iron oxides to colour our products. AusLCI data for iron ore production have been used to model the impacts of the oxides.

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

Product Groupings

Austral Masonry produces a significant number of product variations (>300), based on a set of more than twenty mix designs. To present the results in a meaningful manner, our products have been grouped by "product group". We considered this to be the most suitable presentation that reduces the variation when calculating the environmental profile for a particular product, while providing a clear delineation for users of the EPD. The product groups are detailed in the following table.

Table 2: Austral Masonry's concrete masonry block products

Main Group	Product Group
Coloured Blocks	GB SANDSTONE ROCK FACE
	GB SANDSTONE SPLIT FACE
	GB SANDSTONE SMOOTH
	GB STONE
	GB SPLITFACE
	GB SMOOTH
	GB HONED
	GB VENEER
	BREEZE BLOCKS
	GB LATITUDE RANGE
	GB AURA
Grey Blocks	100MM STANDARD
	200MM STANDARD
	150MM MORTARLESS
Retaining Wall Blocks	HERON
	MORETON
	BRIBIE
	HAYMAN

Each product group within the coloured blocks and retaining wall blocks contains products from two up to a dozen different concrete mix designs. The three product groups that sit within the grey blocks main group are all produced with the same mix design.

We have applied production volume weighted averages when determining the environmental profile for each product group.

Allocation

The allocation hierarchy outlined in ISO14044 (ISO2006b) and joint co-product allocation rules from EN15804 have been followed.

The materials, products, and processes in the life cycle of concrete masonry products that require allocation are:

- Production of various concrete masonry products: Austral Masonry manufactures a range of concrete masonry products and retaining wall blocks. Energy use for concrete block production has been allocated to the products based on their share in the total mass of products.
- Coarse aggregates: coarse aggregates (and manufactured sand) are produced through crushing of rock, which is graded in different sizes. The process cannot be subdivided and energy required for the crushing and screening does not differentiate between products. Therefore, the background data used show aggregates (including manufactured sand) have been allocated based on the mass of product.
- Recycled crushed glass sand: after collection, post-consumer recycled glass is transported to a sorting facility and graded by colour. Glass cullets are washed and crushed before they are transported to Austral Masonry. The life cycle of recycled crushed glass sand starts with transport to the sorting facility (cut-off approach).
- Bottom-ash and Middle-ash: bottom-ash and middle-ash (unclassified fly ash) are by-products from coal-fired power plants. These ashes are low-value materials for which there are limited applications. To our knowledge there are no specific Australian data available that would allow a comprehensive analysis and co-product allocation of electricity, bottom-ash, middle-ash and other co-products of coal-fired power stations. Therefore, we have assumed that all environmental impacts of the power plant are allocated to the main product: electricity. The bottom-ash and middle-ash only receive the burdens of collection and transport. This cut-off approach is in line with the current AusLCI data (v1.36).
- Blast furnace slag (BFS): BFS is a by-product from steelmaking. Partly depending on the type and quality of the slag, it can be used in different applications. Cement replacement is generally considered a high value replacement. We have used the standard 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.
- Landfill: landfill is a multi-input process. Physical causality has been used to allocate emissions in landfill.

Cut-off Criteria

All inputs and outputs to a process have been included where possible. The cut-off criteria applied are 1% of renewable and non-renewable primary energy usage and 1% of the total mass input of a process.

The materials and processes that have been excluded are:

- Greases and lubricants, other minor ancillary materials used during precast concrete products production, as they are well below the cut-off and considered immaterial.
- Packaging of admixtures and oxides are also well below the cut-off:
    - Admixtures make up less than 0.2% of the mass of the masonry blocks. Packaging of admixtures (IBCs) is estimated to make up less than 0.01% of total mass inputs and can be reused.

    - Oxides make up less than 1% of the mass of the masonry blocks. Packaging of oxides (20 kg lined paper bags) is estimated to make up less than 0.01% of total mass inputs.

- Packaging of concrete masonry blocks. Masonry blocks are stacked and held together using plastic (polyester or polypropylene) strapping bands. The amount of strapping is estimated to be less than 0.05% of total product mass.

The total (cumulative) of neglected input flows for the cradle-to-gate stages is well below 5% of energy usage and mass (the exact percentage has not been determined).

For the purposes of this study, the environmental impacts incorporated in the infrastructure (buildings, plant, equipment, roads, vehicles, etc.) associated with manufacturing products is excluded from the product system. Other capital goods (e.g. transport equipment, power lines, etc.) are also excluded. Overhead energy use (e.g. for offices) at Austral Masonry's Gympie manufacturing site could not be distinguished from process energy use and is therefore included in the LCA. This represents a conservative approach.

The exclusion of capital goods (production equipment and infrastructure) and personnel is in line with the Product Category Rules (PCR) (Environdec 2020a).

Key assumptions

The following key assumptions have been made:

- **Concrete composition:** concrete composition of each product is taken from Austral Masonry's internal operating systems and is considered of high quality.

- **Production waste:** production waste tonnage is measured at the plant and an average production waste percentage (0.84%) has been incorporated across all products into the environmental profiles.

- **Transport of raw materials to Gympie**: transport modes for raw materials where data was not provided has been estimated. This has no material impact on the LCA results.

- **Cement composition and production process:** the cement composition has been estimated based on industry knowledge and information provided by Austral Masonry. The White Portland cement is modelled as a standard Portland cement (95% clinker; 5% gypsum). The GP cement contains 3-5% mineral addition, and has been modelled as 91% clinker, 4% limestone, 5% gypsum. Both cements are imported (from Malaysia and Vietnam respectively). Detailed data on overseas cement manufacturing was not available, so we have used adjusted AusLCI data. If the local production process varies significantly from the generic AusLCI data, then this will impact on the results of the LCA.

- **Admixtures:** Austral Masonry has provided information on which admixtures they use for their concrete block masonry products. Due to lack of detail regarding admixture constituents and production data, European EPDs for admixtures (EFCA 2015a, b) have been used.

- **Oxides:** Austral Masonry uses various iron oxides to colour concrete blocks. We have modelled these using iron ore production.

- **Washed sand:** Some of the sand supplied to Austral Masonry in Gympie is double washed or triple washed sand. AusLCI data for natural sand production has been used and it has been assumed that the electricity used in the sand production process doubles or triples for double washed sand and triple washed sand, respectively. We assumed that washing water is recycled and have not adjusted water use data.

Content Declaration

The concrete masonry blocks may have unique characteristics, but all are made with a limited number of concrete ingredients. The concrete constituents consist of General Purpose (GP) cement and/or White Portland cement binder, fine aggregates (natural sand and manufactured sand), and water. Product mixes also contain small amounts of concrete admixtures and colouring oxides to achieve desired properties. The mix designs for concrete masonry blocks are provided in Table 3.

The new Aura Blocks are characterised by the use of secondary materials (GGBFS, bottom ash, recycled crushed glass) and reduction in cement content. The composition of the Aura Blocks is provided in Table 4.

Secondary materials are defined in line with ISO 14021.

Table 3: Product Compositions (%m/m) – Concrete Masonry Blocks

Concrete Mix	White Portland Cement	GP Cement	Natural Sand	Admixtures	Oxides
COLOURED BLOCKS	0-15%	0-15%	85-90%	<0.2%	<1%
GREY BLOCKS	-	8-12%	88-92%	<0.1%	-
RETAINING WALL BLOCKS	0-15%	0-15%	85-90%	<0.2%	<1%

Table 4: Product composition (%m/m) – Aura Blocks

Product	White Portland Cement	General Purpose Cement	Supplementary Cementitious	Natural Sand	Coal By-Products (Bottom Ash + Middle Ash)	Recycled Crushed Glass	Admixtures	Oxides
AURA PORCELAIN	9.60%	-	4.00%	45.00%	25.00%	16.40%	0.03%	0.00%
AURA GREY	-	12.50%	-	34.50%	36.40%	16.60%	0.03%	0.00%
AURA OAK	-	12.50%	-	34.50%	36.40%	16.60%	0.03%	0.35%

The products included in this EPD do not contain any substances of very high concern as defined by European REACH regulation (ECHA 2022) in concentrations >0.1% (m/m).

Dust from this product is classified as Hazardous according to the Approved Criteria for Classifying Hazardous Substances 3rd Edition (NOHSC 2004). When concrete products are cut, sawn, abraded or crushed, dust is created which contains crystalline silica, some of which may be respirable (particles small enough to go into the deep parts of the lung when breathed in), and which is hazardous. Exposure through inhalation should be avoided.

Life Cycle Assessment

Results

An LCA analyses the environmental processes in the value chain of a product. It provides a comprehensive evaluation of all upstream (and sometimes downstream) material and energy inputs and outputs. The results are provided for a range of environmental impact categories, in line with EN 15804 +A1, per declared unit covering the A1-A3 life cycle stages (cradle-to-gate).

Declared Unit

Concrete masonry blocks are available in various shapes and sizes that are specifically designed for different styles and applications. The declared unit that covers all the permutations within the scope of the products included in this EPD is: 1 tonne (1,000 kg) of concrete masonry products.

A reference service life (RSL) is not declared, as the EPD covers the cradle-to-gate life cycle only.

Indicators

Table 5: Environmental Indicators included in this assessment.

Environmental Indicator	Acronym	Unit	Assumption
Global Warming Potential	GWP	kg CO_2 eq	Global warming impact of greenhouse gases such as carbon dioxide (CO2), measured in kg CO2 equivalents using a global warming potential over a 100-year time horizon.
Ozone Depletion Potential	ODP	kg CFC-11 eq	Relative impact that the product can cause to the stratospheric ozone layer, measured in kg trichlorofluoromethane (CFC-11) equivalents
Acidification Potential	AP	kg SO_2 eq	Increase of soil and water acidity that the product can cause, measured in kg sulphur dioxide (SO2) equivalents.
Eutrophication Potential	EP	kg PO_4^{3-} eq	Potential impact of nutrification by nitrogen and phosphorus to aquatic and terrestrial ecosystems, for example through algal blooms, measured in kg phosphate (PO43-) equivalents.
Photochemical Ozone Creation Potential	POCP	kg C_2H_4 eq	Also known as summer smog, the potential impact from oxidising of volatile compounds in the presence of nitrogen oxides (NOx) which frees ozone in the low atmosphere, measured in kg ethene (C2H4) equivalents.
Abiotic Depletion Potential (elements)	ADPE	kg Sb eq	Economic impact from the depletion of scarce non-renewable resources such as metals, measured in kg antimony equivalents.
Abiotic Depletion Potential (Fossil Fuels)	ADPF	MJ	Economic impact from depletion of fossil fuel resources such as oil or natural gas, expressed using their net calorific value.

Table 6: Parameters describing resource use.

Parameter	Acronym	Unit
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 resources 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

Table 7: Other environmental information describing waste categories.

Parameter	Acroynym	Unit
Hazardous waste disposal	HW	kg
Non-hazardous waste disposed	NHW	kg
Radioactive waste disposed	RW	kg

Table 8: Other environmental information describing output flows.

Parameter	Acroynym	Unit
Components for re-use	MFR	kg
Materials for recycling	MER	kg
Exported energy	EE	MJ per energy carrier

Environmental Performance

The environmental profiles have been established based on the life cycle impact assessment stipulated by EN 15804:2012+A1:2013. The cradle-to-gate environmental profiles per tonne of concrete masonry blocks are presented in the following tables:

Table 9:
Aura Porcelain
Aura Grey
Aura Oak

Table 10:
GB Sandstone Rock Face
GB Sandstone Split Face
GB Sandstone Smooth
GB Stone

Table 11:
GB Split Face
GB Smooth
GB Veneer
Breeze Blocks

Table 12:
GB Latitude
100MM Standard
200MM Standard
150MM Mortarless

Table 13:
Heron
Moreton
Bribie
Hayman

Table 9: Environmental profiles, Austral Masonry concrete masonry blocks, stages A1-A3, per tonne

Indicator	Unit	Aura Porcelain	Aura Grey	Aura Oak
GWP	kg CO_2 eq	147	171	171
ODP	kg CFC11 eq	3.65E-06	3.68E-06	3.72E-06
AP	kg SO_2 eq	0.538	0.600	0.601
EP	kg PO_4^{3-} eq	0.0753	0.0861	0.0863
POCP	kg C_2H_4 eq	0.0311	0.0331	0.0333
ADPE	kg Sb eq	1.20E-06	9.45E-07	1.03E-06
ADPF	MJ_{NCV}	1180	1230	1230
Parameters				
PERE	MJ_{NCV}	1.88E+01	3.42E+01	3.42E+01
PERM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
PERT	MJ_{NCV}	1.88E+01	3.42E+01	3.42E+01
PENRE	MJ_{NCV}	1.19E+03	1.24E+03	1.24E+03
PENRM	MJ_{NCV}	1.66E+00	1.66E+00	1.66E+00
PENRT	MJ_{NCV}	1.19E+03	1.24E+03	1.25E+03
SM	kg	4.17E+02	5.34E+02	5.34E+02
RSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.46E+00	1.10E+00	1.10E+00
HW	kg	1.78E-06	1.78E-06	1.78E-06
NHW	kg	1.69E-01	1.60E-01	1.60E-01
RW	kg	3.10E-04	3.10E-04	3.10E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	8.40E+00	8.40E+00	8.40E+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: Environmental profiles, Austral Masonry concrete masonry blocks, stages A1-A3, per tonne

Indicator	Unit	GB Sandstone Rock Face	GB Sandstone Split Face	GB Sandstone Smooth	GB Stone
GWP	kg CO_2 eq	170	162	168	160
ODP	kg CFC11 eq	4.00E-06	3.68E-06	3.96E-06	3.99E-06
AP	kg SO_2 eq	0.570	0.548	0.566	0.551
EP	kg PO_4^{3-} eq	0.0832	0.0800	0.0827	0.0799
POCP	kg C_2H_4 eq	0.0332	0.0312	0.0330	0.0330
ADPE	kg Sb eq	2.38E-05	2.32E-05	2.43E-05	4.19E-05
ADPF	MJ_{NCV}	1290	1230	1280	1220
Parameters					
PERE	MJ_{NCV}	2.04E+01	2.48E+01	2.09E+01	3.56E+01
PERM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ_{NCV}	2.04E+01	2.48E+01	2.09E+01	3.56E+01
PENRE	MJ_{NCV}	1.29E+03	1.23E+03	1.29E+03	1.24E+03
PENRM	MJ_{NCV}	1.68E+00	1.65E+00	1.68E+00	1.63E+00
PENRT	MJ_{NCV}	1.30E+03	1.23E+03	1.29E+03	1.25E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ_{NCV}	1.91E-04	1.87E-04	1.95E-04	3.47E-04
NRSF	MJ_{NCV}	1.82E-03	1.78E-03	1.86E-03	3.31E-03
FW	m^3	2.09E+00	1.98E+00	2.07E+00	1.77E+00
HW	kg	4.32E-06	4.23E-06	4.38E-06	6.33E-06
NHW	kg	2.41E-01	2.43E-01	2.43E-01	3.07E-01
RW	kg	7.78E-04	7.61E-04	7.88E-04	1.15E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	8.40E+00	8.40E+00	8.40E+00	8.40E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 11: Environmental profiles, Austral Masonry concrete masonry blocks, stages A1-A3, per tonne

Indicator	Unit	GB Split Face	GB Smooth	GB Veneer	Breeze Blocks
GWP	kg CO_2 eq	163	168	174	172
ODP	kg CFC11 eq	4.03E-06	4.37E-06	4.05E-06	4.03E-06
AP	kg SO_2 eq	0.553	0.568	0.588	0.580
EP	kg PO_4^{3-} eq	0.0805	0.0829	0.0856	0.0844
POCP	kg $C2H_4$ eq	0.0332	0.0350	0.0340	0.0337
ADPE	kg Sb eq	4.43E-05	3.87E-05	2.37E-05	2.83E-05
ADPF	MJNCV	1260	1300	1320	1300
Parameters					
PERE	MJNCV	3.02E+01	2.80E+01	2.07E+01	2.30E+01
PERM	MJNCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJNCV	3.02E+01	2.80E+01	2.07E+01	2.30E+01
PENRE	MJNCV	1.27E+03	1.32E+03	1.32E+03	1.31E+03
PENRM	MJNCV	1.61E+00	1.62E+00	1.67E+00	1.66E+00
PENRT	MJNCV	1.27E+03	1.32E+03	1.32E+03	1.31E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJNCV	3.67E-04	3.19E-04	1.90E-04	2.30E-04
NRSF	MJNCV	3.50E-03	3.04E-03	1.81E-03	2.19E-03
FW	m^3	1.90E+00	1.95E+00	2.11E+00	2.06E+00
HW	kg	6.56E-06	5.94E-06	4.30E-06	4.81E-06
NHW	kg	3.16E-01	2.96E-01	2.41E-01	2.58E-01
RW	kg	1.19E-03	1.08E-03	7.73E-04	8.68E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	8.40E+00	8.40E+00	8.40E+00	8.40E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 12: Environmental profiles, Austral Masonry concrete masonry blocks, stages A1-A3, per tonne

Indicator	Unit	GB Latitude	100MM Standard	200MM Standard	150MM Mortarless
GWP	kg CO_2 eq	164	142	142	142
ODP	kg CFC11 eq	4.00E-06	3.02E-06	3.02E-06	3.02E-06
AP	kg SO_2 eq	0.556	0.484	0.484	0.484
EP	kg PO_4^{3-} eq	0.0810	0.0706	0.0706	0.0706
POCP	kg $C2H_4$ eq	0.0330	0.0261	0.0261	0.0261
ADPE	kg Sb eq	3.87E-05	1.05E-06	1.05E-06	1.05E-06
ADPF	MJ_{NCV}	1260	1050	1050	1050
Parameters					
PERE	MJ_{NCV}	2.78E+01	3.02E+01	3.02E+01	3.02E+01
PERM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ_{NCV}	2.78E+01	3.02E+01	3.02E+01	3.02E+01
PENRE	MJ_{NCV}	1.27E+03	1.06E+03	1.06E+03	1.06E+03
PENRM	MJ_{NCV}	1.63E+00	1.53E+00	1.53E+00	1.53E+00
PENRT	MJ_{NCV}	1.27E+03	1.06E+03	1.06E+03	1.06E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ_{NCV}	3.18E-04	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ_{NCV}	3.03E-03	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.94E+00	1.74E+00	1.74E+00	1.74E+00
HW	kg	5.95E-06	1.64E-06	1.64E-06	1.64E-06
NHW	kg	2.95E-01	1.70E-01	1.70E-01	1.70E-01
RW	kg	1.08E-03	2.85E-04	2.85E-04	2.85E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	8.40E+00	8.40E+00	8.40E+00	8.40E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 13: Environmental profiles, Austral Masonry concrete masonry blocks, stages A1-A3, per tonne

Indicator	Unit	Heron	Moreton	Bribie	Hayman
GWP	kg CO_2 eq	153	159	155	156
ODP	kg CFC11 eq	3.35E-06	3.60E-06	3.41E-06	3.44E-06
AP	kg SO_2 eq	0.521	0.539	0.526	0.528
EP	kg PO_4^{3-} eq	0.0759	0.0787	0.0766	0.0770
POCP	kg C_2H_4 eq	0.0289	0.0306	0.0293	0.0296
ADPE	kg Sb eq	2.27E-05	2.31E-05	2.28E-05	2.41E-05
ADPF	MJ_{NCV}	1150	1200	1170	1170
Parameters					
PERE	MJ_{NCV}	2.93E+01	2.57E+01	2.83E+01	2.86E+01
PERM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ_{NCV}	2.93E+01	2.57E+01	2.83E+01	2.86E+01
PENRE	MJ_{NCV}	1.16E+03	1.21E+03	1.17E+03	1.18E+03
PENRM	MJ_{NCV}	1.61E+00	1.64E+00	1.62E+00	1.62E+00
PENRT	MJ_{NCV}	1.16E+03	1.21E+03	1.18E+03	1.18E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ_{NCV}	1.84E-04	1.86E-04	1.84E-04	1.95E-04
NRSF	MJ_{NCV}	1.75E-03	1.77E-03	1.75E-03	1.86E-03
FW	m^3	1.86E+00	1.95E+00	1.88E+00	1.88E+00
HW	kg	4.15E-06	4.21E-06	4.16E-06	4.31E-06
NHW	kg	2.45E-01	2.43E-01	2.44E-01	2.49E-01
RW	kg	7.48E-04	7.58E-04	7.49E-04	7.76E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	8.40E+00	8.40E+00	8.40E+00	8.40E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Variation (A1-A3) per impact category

The underlying analysis in the LCA showed that for the GWP of concrete product groups, the majority of products stay within ±10% of the weighted average environmental impacts.

As some products fall outside the ±10% range for grouped products, we include the following analysis to assist the user of the EPD with the interpretation of the results. The five product groups that show a variation larger than ±10% are:

- **GB SANDSTONE SMOOTH:** 2% of these products (by production volume) fall outside the range, as they are 12% lower than the weighted average GWP for this group.
- **GB SPLITFACE:** 2% of these products (by production volume) fall outside the range, as they are 16% higher than the weighted average GWP for this group.
- **GB SMOOTH:** 12% of these products (by production volume) fall outside the range, as they are up to 13% higher than the weighted average GWP for this group.
- **HERON:** 19% of these products (by production volume) fall outside the range, as they are 11% higher than the weighted average GWP for this group.
- **HAYMAN:** 1% of these products (by production volume) fall outside the range, as they are 11% higher than the weighted average GWP for this group.

The analysis shows that either a very small percentage of products falls outside the range, and/or the allowable range is exceeded by a small margin only. Therefore, we believe that the proposed grouping is sensible and defensible.

We do note that the variation in depletion of abiotic resources (elements) (ADPE) is much larger in some product groups than the variation in GWP. The ADPE results are dominated by admixtures, and minor (absolute) differences in admixture content between concrete mixes can result in significant relative differences of almost a factor 2.5 (i.e. 250%) difference between lowest and highest results within a product group.

Other Environmental Information

Austral Masonry remains committed to sustainability with a focus on responsible sourcing of raw materials, increasing recycled content used in the production of many of our products, manufacturing processes and inputs consistently refined to reduce environmental impact, and recently Austral Masonry Prospect, NSW, closed in November 2020, to be replaced with Austral Masonry Oakdale, NSW, a $75M state of-the-art facility. The Oakdale site is currently in the commissioning stage and due to open in the first half of FY22. The new facility contains a 240kW rooftop solar PV system and a closed loop water recycling system, for the capture, treatment and reuse of process water. The site also comprises a new Design Studio which includes a 113kW rooftop solar PV system.

Austral Masonry, as part of the Brickworks group, has sustainability at its core. As one of the most diverse building products manufacturers, Brickworks employs over 2,100 people across Australia and North America. We manufacture products from masonry bocks, retaining walls, pavers and bricks to precast concrete panels, façade systems and roof tiles. Brickworks offers a full suite of high quality building products. The built environment is the fabric of our cities and our lives and Brickworks' products form part of this ever-changing fabric.

Our products are integrated into thousands of homes, apartments, commercial buildings, landscapes and infrastructure projects built each year. Brickworks' sustainability strategy, "Build for Living: Towards 2025", recognises the substantial environmental and social impacts of the built environment, and the role our products play in creating sustainable developments. We understand our responsibilities, and the impact and influence we have on the environment, our customers, employees, communities, and shareholders.

Our sustainability strategy focuses on the opportunity to make buildings and cities safe, resilient and sustainable. Design that incorporates sustainability brings greater energy and resource efficiency over the operational lifetime of a building. Our strategy is to manufacture products in a sustainable way, with strong governance and a culture of care for our community.

For more information on our sustainability initiatives please see:
Our 2021 Sustainability Report https://www.brickworks.com.au/wp-content/uploads/2021/10/BKW_SR2021_WEB.pdf

"Build for Living: Towards 2025" https://bbp.style/PUBLIC/investor-centre/Sustainability-Reports/BKW-Towards-2025-Brochure-21Sep20.pdf

We have more information on environmental performance, social and governance at:
https://www.brickworks.com.au/sustainability/#policies-and-data

References

Reference	Detail
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EN 16757	EN 16757:2017, Sustainability of construction works – Environmental product declarations - Product Category Rules for concrete and concrete elements, European Committee for Standardization (CEN), Brussels, November 2017
ECHA 2022	European Chemicals Association, Candidate List of substances of very high concern for Authorisation, published in accordance with Article 59(10) of the REACH Regulation, Helsinki Accessed on 1 February 2022 from: **https://echa.europa.eu/candidate-list-table**
EFCA 2015a	EPD of Plasticizer and superplasticizer, IBU EPD Declaration number EPD-EFC-20150091-IAG1-EN, issued 14-09-2015, based on EN 15804 and PCR for concrete admixtures; EPD owner: EFCA - European Federation of Concrete Admixtures Associations
EFCA 2015b	EPD of Water Resisting Admixtures, IBU EPD Declaration number EPD-EFC-20150090-IAG1-EN, issued 16-09-2015, based on EN 15804 and PCR for concrete admixtures; EPD owner: EFCA - European Federation of Concrete Admixtures Associations
Environdec 2019	General Programme Instructions for the International EPD® System, version 3.01, published on 18 September 2019
Environdec 2020a	PCR2012:01 (version 2.33), Product category rules according to ISO 14025 and EN 15804, Combined PCR and PCR Basic Module for Construction products and Construction services, registration number 2012:01, published on 18 September 2020
Environdec 2020b	PCR2012:01-SUB-PCR-G (version 2.31), Product category rules according to ISO 14025 and EN 15804, Concrete and concrete elements (EN 16757:2017), registration number 2012:01, published on 18 September 2020
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ISO 14021	ISO14021:2016, Environmental labels and declarations - Self-declared environmental claims - Type II environmental declarations. International Organization for Standardization, Geneva, Switzerland, 2016
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AS/NZS 4455.1	AS/NZS 4455.1:2008 Masonry Units, Standards Australia, Sydney, 2008
NOHSC 2004	Approved Criteria for Classifying Hazardous Substances 3rd Edition, Commonwealth of Australia - National Occupational Health and Safety Commission (NOHSC), Canberra, October 2004

Independent Verification Information

The EPD and LCA have been aligned to the General Programme Instructions for the International EPD® System, version 3.01 (Environdec 2019).

Product Catetory Rules:	PCR 2012:01 Construction Products and Construction Services, Version 2.33, 2020-09-18 PCR 2012:01-SUB-PCR-G Concrete and concrete elements, Version 2.31, 2020-09-18
Reference Year for Data:	2020-07-01 – 2021-06-30
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
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Mandatory Statements

This EPD is verified to be compliant with EN 15804. EPD of construction products may not be comparable if they do not comply with EN15804. EPDs within the same product category but from different programs or utilising different PCRs may not be comparable.

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