FOSROC

Environmental product declaration

Renderoc HB25

Programme operator: EPD International | www.environdec.com
Regional programme: EPD Australasia | www.epd-australasia.com
EPD registration number: EPD-IES-0021665:001
Valid from: 2025-04-17
Valid until: 2030-04-16

AUSTRALASIA EPD®
EPD® THE INTERNATIONAL EPD® SYSTEM
ECO PLATFORM EPD VERIFIED

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

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 epd-australasia.com

What is an Environmental Product Declaration?

An Environmental Product Declaration (EPD) tells the environmental story of a product over its life cycle in a format that is clear and transparent. It is science-based, independently verified and publicly available.

EPDs help manufacturers translate complex sustainability information about their product's environmental footprint into simpler information that governments, companies, industry associations and end consumers can trust to make decisions.

An EPD communicates the environmental impacts at different stages in a product's life cycle. This may include the carbon emitted when it's made, and any emissions that pollute the air, land or waterways during its use.

This EPD covers the environmental impacts of Renderoc HB25 when used both inside and outside a building envelope subject to treatment level. The product is manufactured at the Parchem Construction Supplies' facility located in Wyong, NSW, Australia.

This EPD is type A, cradle to gate with modules C1–C4 and module D (A1–A3 + C + D) with end-of-life options included. 'Cradle' refers to the raw material extraction and 'the gate' is the gate of the manufacturing facility as the product is ready to go out to customers.

Contents

About Fosroc and Parchem

Fosroc is a world leader in construction solutions. Since the company's beginnings over 80 years ago, Fosroc has developed into an international leader in delivering construction solutions for virtually any building or infrastructure project. New or old construction above or below ground, we combine high quality products, expert technical support, customer service and innovation to give you the best solution for your project.

We provide construction solutions for; new and old concrete repair, grouts, waterproofing joint fillers & sealants, industrial flooring, protective coatings, surface treatments and concrete additives.

Fosroc has an extensive network of offices and manufacturing locations across Europe, the Middle East, India and Asia, and is further represented in other regions across the world by distributor and licensee partners.

Here's why you'll want to choose Fosroc for your next project:

Expertise That Matters

Our seasoned team of industry specialists brings unparalleled expertise to every job. Whether it's waterproofing, concrete repair, grouting, or protective coatings, we've got you covered.

Innovative Solutions

We don't settle for mediocrity. Fosroc is at the forefront of innovation, constantly developing new products that withstand the test of time. When you partner with us, you're investing in quality and longevity.

Reliable Support

When you choose Fosroc, you're not just getting products; you're gaining a reliable partner. Our customer support is second to none. We're here to troubleshoot, advise, and ensure your project's success.

Discover the Fosroc difference. Let's build something extraordinary together!

DuluxGroup

Parchem Construction Supplies, part of DuluxGroup®, is the licensed manufacturer and distributor of Fosroc, Vector®, Vandex®, and EdenCrete® products in Australia, and Concrete Plus™ is the licensed distributor in New Zealand.

A Future Without Harm

We are commitment to sustainable management of our environmental and social impacts. It is fundamental to the success and wellbeing of both our business and our customers. We therefore aspire to deliver on our safety and sustainability vision of 'A Future Without Harm'. Our vision is emphasised by our Safety & Sustainability Policy.

Safety and Sustainability

Our strategy is focused around 4 key areas of risk including: fatality prevention, injury prevention, sustainable products, and efficient operations. Each area of risk is supported by focused improvement plans and initiatives resulting in significant risk reduction across the business. A key aspect to delivering sustainable products and having efficient and sustainable operations is to ensure we manage external stakeholder requirements by the development and management of critical management plans.

Community

DuluxGroup and its brands (which includes Parchem), aims to be a welcome member of – and to reflect – the communities where we operate. Building a diverse and inclusive workforce is of critical importance to DuluxGroup.

We know that diversity of gender, culture and age, as well as experience, skills and thinking truly enriches our culture and is fundamental to our success. Each year DuluxGroup supports hundreds of community organisations and individual disadvantaged members of the community.

Fosroc Concrete Repair Solutions

We believe that concrete should be built to last – our high quality protective systems and repair materials can significantly prolong the life of a structure beyond its original design life.

We have a comprehensive range of concrete repair products that can provide the solutions for:

- Concrete Defects – Cracks, low concrete cover, surface imperfections and patch repairs
- Structural defects
- Potable Water Applications
- Corrosion Control

Our online resources can help you help identify concrete defects on-site and recommended a Fosroc repair solution.

You can also contact a Fosroc representative, who can come to site, assess the repair and determine the best course of action, including product and application recommendations.

Fosroc Renderoc range

Our Renderoc range offers products that can repair both defects in new concrete as well as concrete which has cracked or spalled in older reinforced concrete structures where corrosion of the steel reinforcement has taken place.

Different Renderoc grades are compatible with different strength grades of concrete. The Plus range is made to be compatible with new concrete structures which are manufactured with high supplementary cementitious materials (SCM) contents.

Once in place, the Renderoc products are homogeneous with the host concrete.

In this EPD: Renderoc HB25

Renderoc HB25 is a high build, shrinkage compensated concrete repair mortar for patching up to 1m² sections in concrete up to 30 MPa.

It can be applied to vertical concrete patches up to 80mm deep. Suitable for use with Galvashield anode protection systems.

- 28 day Strength: 23MPa
- Application: Trowel, Wet Spray
- Compatible concrete strength: 15 to 30MPa
- Suitable for use with Galvashield anodes
- Trowel Build / Depth: 10mm to 80mm vertical

For results of other products in the Fosroc Renderoc range? Please visit www.fosroc.com.au/products

Our ANZ footprint

Parchem Construction Supplies, part of DuluxGroup, manufactures and distributes Fosroc products in Australia. In New Zealand, Concrete Plus is the licensed distributor.

- Manufacturing facility
- Fosroc construction centre
- Dulux Group distribution centre

For specific locations or to find your nearest stockist, use the store locator tool www.fosroc.com.au/stockists.

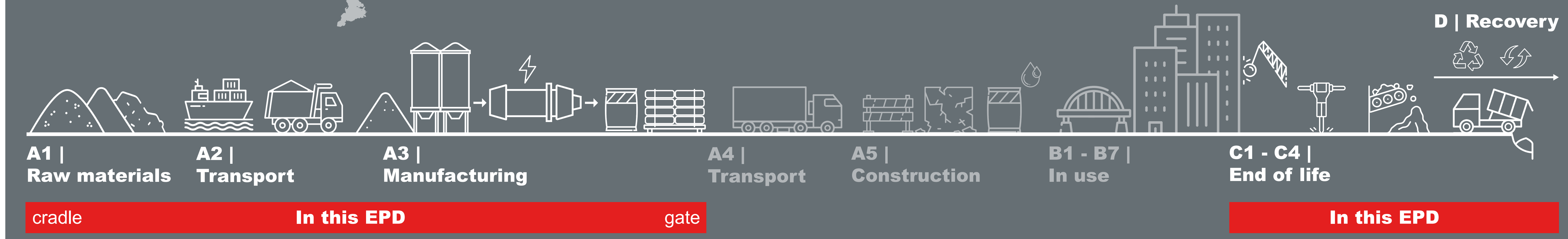
For direct deliveries or further assistance, contact Customer Service via 1800 812 864 (AU) or 0800 657 156 (NZ).

Product life cycle

This EPD is type A, 'cradle-to-gate' with modules C1-C4 and module D (A1-A3 + C + D). This means that the production (modules A1-A3), end-of-life (C1-C4) and recovery (D) stages are modelled in this EPD. The construction process (modules A4-A5) and use stages (B1-B7) are not modelled.

The production stage (A1-A3) involves the extraction (cradle) of all raw materials, transport to the manufacturing facility and the weighing and mixing of these materials to make the product. The finished dry mix is packaged ready for distribution to the customer (gate).

Once in place, the Renderoc products are essentially homogeneous with the host concrete. Therefore, the Fosroc Renderoc products are assumed to follow the same end-of-life pathway as concrete. The end-of-life stage includes the deconstruction of the concrete structure, the transport to landfill, waste processing and the landfilling of the concrete that is not suitable for recovery.



How to interpret and use this EPD

We developed this product specific EPD to help to showcase the environmental credentials of their products. This EPD provides life cycle data that can be used to calculate the impacts of concrete repair solution products on the overall environmental performance of a building. These data sets can be used by specifiers and developers to calculate and present the environmental impacts of particular construction projects.

EPDs are not always comparable

When comparing EPDs it is important to consider:

- EPDs within the same product category but from different programmes or utilising different Product Category Rules (PCRs) may not be comparable.
- EPDs of construction products may not be comparable if they do not comply with EN 15804 or if they are produced using different Product Category Rules.
- EPDs of construction products from a group of manufacturers (industry-wide EPD) may not be comparable to an EPD of a similar construction product that has been generated by a single manufacturer (product-specific or manufacturer specific EPD).
- Understanding the detail is important in comparisons. Expert analysis is often required to understand the detail and ensure data is truly comparable, to avoid unintended misinterpretation.
- The best way to compare products and materiality of differences is to place them into the context of a structure across the whole life cycle.

Parchem Construction Supplies Pty Ltd. has sole ownership, liability, and responsibility for this EPD. To the best of Parchem Construction Supplies Pty Ltd.'s knowledge, the information provided in this document is accurate and reliable. However, no warranty, guarantee or representation is made as to its accuracy, reliability or completeness. EPDs within the same product category but from different programmes may not be comparable.

Green Star

Green Star is Australasia's largest voluntary sustainability rating system for non-residential buildings, fitouts and communities.

This EPD can allow the represented products to qualify for points under the Green Building Council Australia (GBCA) Green Star rating system.

The Green Star rating system has also been adopted and adapted for New Zealand conditions by the New Zealand Green Building Council.

Technical information

Declared Unit

ISO 14040 defines a functional unit as 'quantified performance of a product system for use as a reference unit'. EPDs that do not cover the full product life cycle from raw material extraction through to end-of-life use the term 'declared unit' instead.

The declared unit for this EPD is:

one kg of individual product plus its packaging.

Industry classification

Table 1 shows the relevant Australian standard and application for the product in this EPD.

Table 1: Industry Classification

Product	Classification	Code	Category
Refractory products and structural nonrefractory clay products.	UN CPC Ver.2.1	37330	Refractory cements, mortars, concretes and similar compositions n.e.c
	ANZSIC 2006	2033	Ready-Mixed Concrete Manufacturing

Content Declaration

Table 2: Composition of Fosroc Renderoc concrete repair mortar products (per 1 kg)

Raw materials	Weight, kg	Post-consumer recycled material, weight -% of product	Biogenic material, weight-% of product	Biogenic material, kg C/ product
Cementitious and pozzolan content	0.401	0	0	0
Sand	0.559	0	0	0
Chemicals and additives	0.04	0	0	0
Total	1	0	0	0

Table 3: Composition of packaging (per 1 kg)

Packaging	Weight, kg	Weight-%	Weight biogenic carbon, kg C/kg
FOS bag	0.00315	0.315%	0
Stretch wrap	0.00350	0.350%	0
Pallet cap	8.00E-06	0.001%	0
Pallet slip sheet	3.25E-04	0.033%	1.82E-04
Pallet	0.00136	0.136%	7.50E-04
Total, packaging	0.00834	0.834%	9.32E-04

Dangerous substances from the candidate list of SVHC for Authorisation

No products declared within this EPD contain substances exceeding the limits for registration according to the European Chemicals Agency's 'Candidate List of Substances of Very High Concern for authorisation' (European Union, 2024). Concrete repair mortar products are classified as non-dangerous goods according to the Land Transport Rule: Dangerous Goods 2005.

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. Dust from these products is classified as Hazardous under the Hazardous Substances and New Organisms Act 1996 (HSNO Act) and is subject to Workplace Exposure Standards (WorkSafe NZ WES-BEI indices Edition 13, April 2022).

System Boundaries

In Life Cycle Assessments (LCA), the system boundary is a line that divides the processes which are included from those which are excluded from the study.

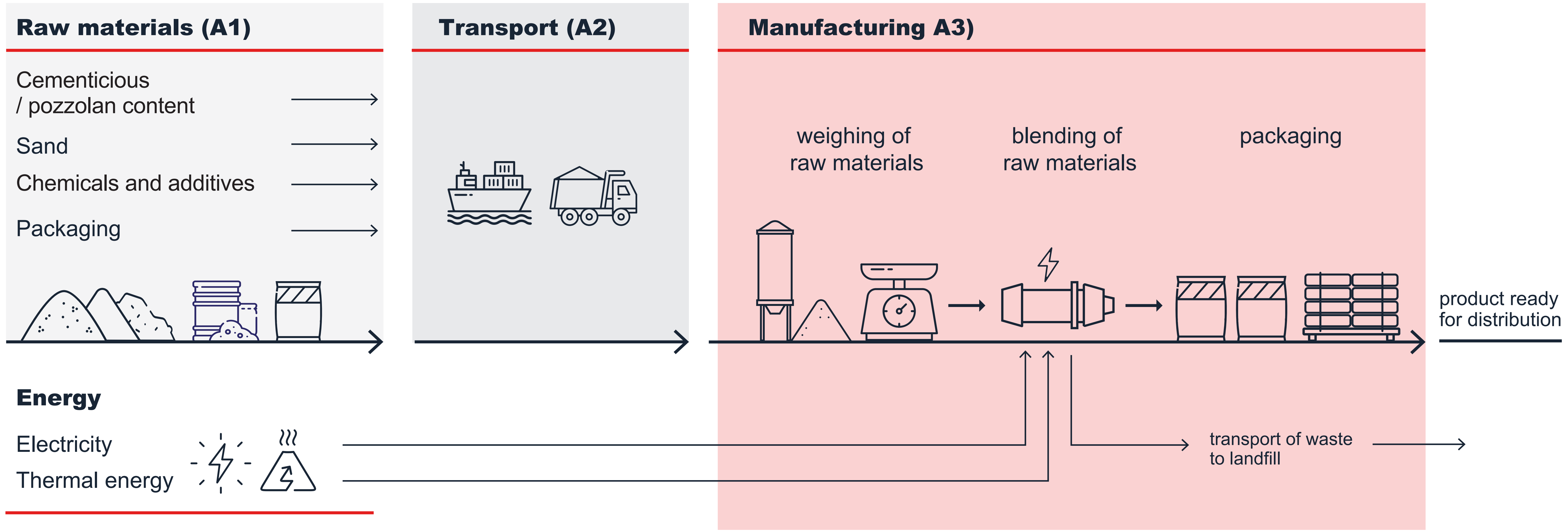
This EPD has a scope of 'cradle-to-gate with modules C1-C4 and module D (A1-A3 + C + D)'. Other life cycle stages (Modules A4-A5, B1-B7) are dependent on particular scenarios and best modelled at the building level.

Table 4: Modules included in the scope of the EPD (X = declared module)

	Product stage			Construction process stage		Use stage							End-of-life				Recovery
	Raw material supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	-	-	-	-	-	-	-	-	-	X	X	X	X	X
Geography	GLO	AU	AU	-	-	-	-	-	-	-	-	-	NZ, AU	NZ, AU	NZ, AU	NZ, AU	NZ, AU
Specific data[1]	56%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 Specific data relates to the impacts associated with manufacturing processes, primarily concerning electricity and LPG, as well as the transportation of raw materials. It also includes the manufacturing of cementitious materials that have EPDs. There is no specific data for the manufacturing of other raw materials.

Technical information



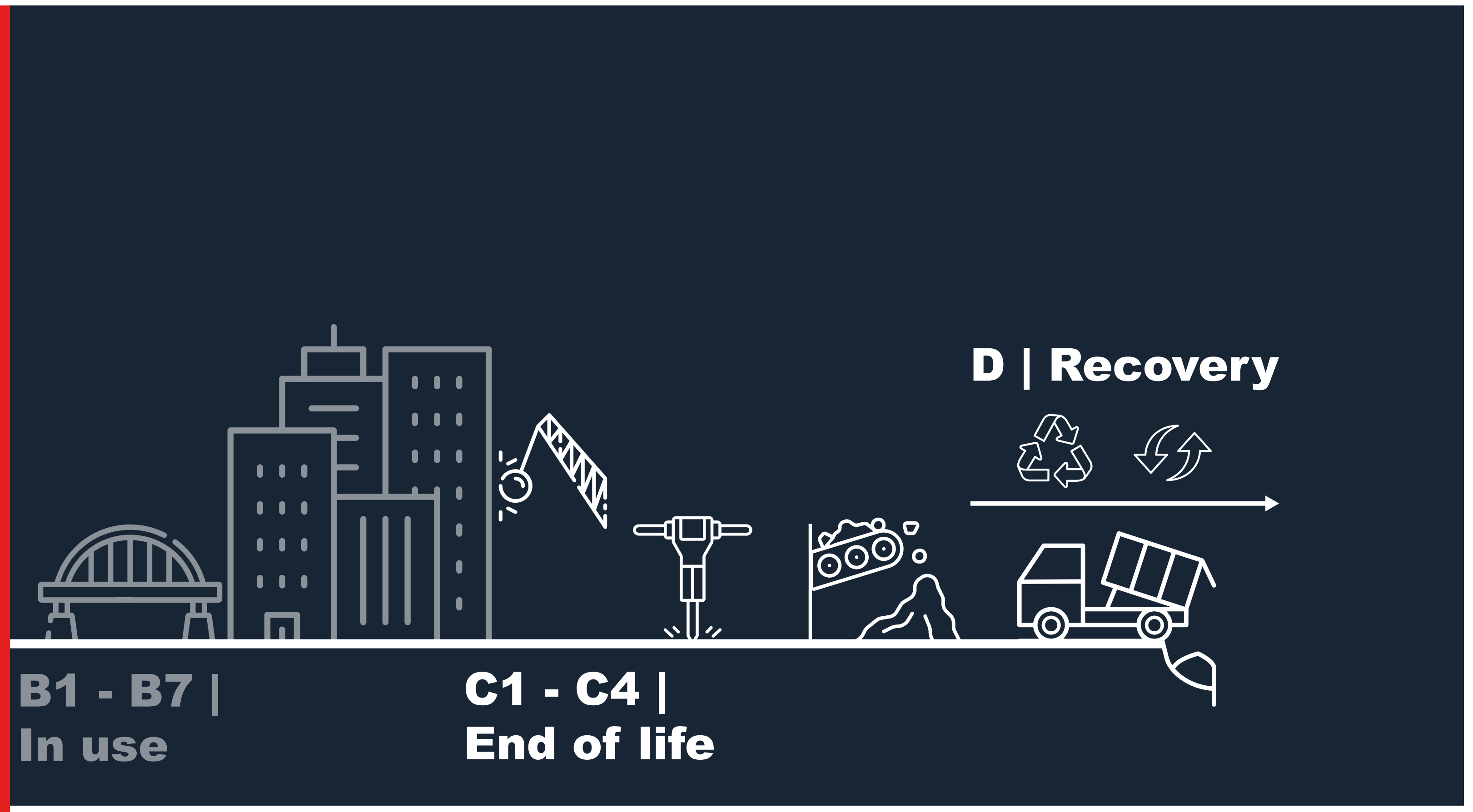
Production (Modules A1-A3)

The production stage includes the environmental impacts associated with raw materials extraction and processing of inputs, transport to, between and within the manufacturing site, and manufacturing of the product at the exit gate of the manufacturing site. The impacts include the production and use of fuels and electricity, production of auxiliary materials and packaging materials, and waste treatment of production wastes.

The manufacturing process involves weighing and dry-mixing raw materials and then packaging the product. Fosroc use a global supply chain to support the mortar and grout products, including Europe, Turkey, South East Asia, China, USA, Japan, and Australia. Primary packaging is sourced from Poland. The materials which comprise most of the product mass, such as cement and sand, are sourced from Australia.

There are no fugitive emissions nor hazardous waste generated in this process. There are no co-products, nor waste generated which has an economic value. Raw material wasted is sent to landfill.

Since Module C is included in the EPD, the use of Module A1-A3 results without considering the results of Module C is discouraged.



End of Life (Modules C1-C4)

Once in place, the mortar and grout products are homogeneous with the host concrete. Therefore, the products are assumed to follow the same end-of-life pathway as concrete. The scenarios included are currently in use and are representative for one of the most probable alternatives in Australasia.

When concrete structure reaches its end-of-life it will be demolished (C1) and the demolition waste is transported to a processing facility (C2). The waste processing (C3) includes the separation of concrete waste from other building materials. The energy consumption estimated for material demolition and excavation, and waste processing is described in Table 6.

Table 5: End of life scenario

Process	Unit (expressed per declared unit of components products or materials and by type of material)
Collection process	0 kg collected separately
Specified by type	1 kg collected with mixed construction waste
Recovery system specified by type	0 kg for re-use
	0.5 kg for recycling
	0 kg for energy recovery
Disposal specified by type	0.5 kg product or material for final deposition
Assumptions for scenario development, e.g. transportation	Deconstruction (C1) – Demolishing with an Excavator – fuel consumption is calculated based on 0.172 kg diesel input per tonne of material. Based on Sphera's LCA FE excavation process. Transport (C2) – 50 km of transport by truck to either treatment site or landfill. End-of-life scenarios were developed based on BRANZ's published data (Dowdell, 2022). Waste processing (C3) – Recovery system – 50% for recycling (R2), (BRANZ, 2022). 0.52 L of diesel per tonne of recycled material produced. Material yield (MMrout) = 100%. Disposal (C4) – Disposal type – 50% modelled as inert material in landfill Reuse and recovery (D) – Boral 2024 EPD S-P-10222 Quarry and Recycling Products (including recycled road base, sand, aggregate and stabilized product)

Recovery and Recycling potential (Module D)

Module D declares a potential credit or burden for the net scrap associated with Fosroc product. Net scrap is the amount of scrap left after scrap from post-consumer needs are removed from scrap produced from product. That is, secondary product used in product manufacture is subtracted from the overall amount of recycled product after the first life cycle. If the net balance is positive, a credit given. The credit is calculated by comparing the impacts associated with primary product produced.

Module D starts at 'end of waste', when the concrete is no longer a waste in its first life cycle and starts to be a potential input for its second life cycle. Module D gives a credit for the net recycling or reuse of materials, as prescribed in EN 15804. The EPD S-P-10222 for Boral Quarry and Recycling Products (including recycled road base, sand, aggregate and stabilized product) is used to represent the credit applied in module D for the recycling of concrete products (Boral, 2024). This EPD provides several virgin aggregate environmental product declarations for Australia. This has been selected because it is assumed that concrete, when recycled, is converted into a recycled aggregate product which replaces virgin aggregates on the market.

Fosroc does not use any recycled aggregate input to their products, and so 100% of the crushed concrete aggregate available for recycling following module C3 can be credited through Module D. The crushed concrete aggregates can replace virgin crushed rock aggregates.

Life cycle inventory (LCI) and assumptions

The data collection period for the study was 1st July 2023 – 30th June 2024.

Upstream data

Upstream raw material extraction datasets excluding cementitious and pozzolan content and admixtures were sourced from the ecoinvent EN15804 Cumulative LCIA v3.10, November 2023 datasets.

Fosroc source general purpose Portland cement type A produced by Cement Australia (Gladstone General Purpose Cement). Data for this cement is based on supplier EPD (Cement Australia, 2023). Upstream data for other materials are also based on specific EPDs wherever available.

Concrete admixtures are all represented using ecoinvent EN15804 Cumulative LCIA v3.10, November 2023 datasets.

The manufacturing process is to create a dry mix of the purchased materials specific to each product bill of materials. Total production at the site (including products not covered in this EPD) has been measured using the total product output for the period of study. There is some mixed waste to landfill.

Utilities such as electricity used in the manufacturing process are allocated to products based on production volumes. Measured data was obtained for all utilities at the site level. Average utility quantities per kg of concrete were calculated based on total mass of concrete produced by the site. In order to allocate utilities per product, these averages are multiplied by the mass of concrete in the product.

LCA software and database

The LCA was conducted in Microsoft Excel. The LCA utilises a combination of EPDs and impact profiles generated by ecoinvent based on the database version 3.10 (Wernet, 2016) and Managed LCA Content (MLC) database (Sphera, 2024), formerly known as GaBi LCI database in the case of modelling residual electricity mix. This database provides life cycle inventory data for raw and process materials obtained from the background system where regional EPD data were unavailable. Datasets sourced from ecoinvent are 'system datasets' modelled as 'Allocation, cut-off, EN15804'. They do not allow the user to make changes.

Recycling and recycled inputs

There is no recycling or use of recycled content / scrap in the production stages of this product. Regionally-specific statistical data is used to inform end-of-life (EOL) recycling values where available to secure high geographical representativeness.

Electricity

The composition of the residual electricity grid of New South Wales mix is modelled in LCA FE based on published data for the financial year 1st July 2023 – 30st June 2024 (Australian Government, 2024). The New South Wales residual electricity mix is made up of coal (86.7%), natural gas (2.66%), heavy fuel oil (0.151%), and coal gases (0.00302%). Of the remaining electricity, 5.29% is imported from Victoria, and 5.16% is imported from Queensland.

The emission factor for the New South Wales residual grid for the GWP-GHG indicator is 1.09 kg CO_2 eq./kWh. As a point of comparison, the national mix is 1.002 kg CO_2 eq./kWh.

Transport

Transport data was collected from Fosroc for all input materials to site. The transport data included the transport modes and distances from suppliers. Transport distances were mapped against each line of BOM data and used to calculate upstream transport impacts. Transport includes sea freight, road freight, and rail freight.

Outbound transport to customer (A4) is not included in the scope of this EPD.

Cut off criteria

Personnel-related processes are excluded as per section 4.3.2 in the PCR (EPD International, 2023).

thinkstep-anz consistently excludes environmental impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the foreground production process, ('capital goods') regardless of potential significance. High-quality infrastructure-related data isn't always available and there is no clear cut-off for what to include. For this reason, capital goods data are applied to LCA studies inconsistently. This is expected to lead to reduced consistency and comparability of EPDs. Capital goods were previously excluded from EPDs, thus including capital goods in current EPDs would further reduce their comparability.

In compliance with EN15804+A2 (EPD International, 2024), the following cut-off criteria were applied during data collection and analysis:

- Mass: LCI data shall include a minimum of 95% of total inflows (mass and energy) per module. If a material flow is less than 1% of the cumulative mass of all the inputs and outputs of the life cycle inventory (LCI), it may be excluded, providing its environmental relevance is not a concern. Packaging of raw materials has therefore been excluded. Raw materials are delivered in bulk and represents a proportion below 1% of cumulative mass and environmental relevance of inputs to the product.
- Environmental relevance: If a flow meets the above criteria for exclusion yet is thought to potentially have a significant environmental impact, it has been included. Material flows which leave the system (emissions) and whose environmental impact (in this case, carbon footprint) is greater than 1% of the whole impact of an impact category that has been considered in the assessment have been covered.
- All processes and flows that are attributable to the analysed system have been included.

Any cut-off criteria applied for background data are described on the ecoinvent website at (Wernet, 2016).

Allocation

For this study, multi-output allocation is applied to the use of LPG and electricity, for which data is provided at a site level. Physical (mass-based) allocation is applied to allocate the use of LPG and electricity across the total volume of products manufactured at the site in the data reference period.

Allocation of further background data (energy and materials) taken from the ecoinvent LCI Database is documented in the following reference website and associated documentation: https://ecoquery.ecoinvent.org/3.10/cutoff/search (ecoinvent, 2023).

End-of-life allocation follows the requirements of EN 15804:2017+A2:2019 § 6.4.3.3 and generally follows the polluter pays principle. Any open scrap inputs into manufacturing remain unconnected. At the end of life of product, scrap is collected for recycling and is thus available to produce a recycling credit within Module D. A credit for net scrap is given in Module D based on the mass of concrete sent for recycling to be converted to recycled aggregate.

Assumptions

- The life span of wooden pallets can vary depending on how well it is treated, used, and maintained and can have between 5-30 use cycles (Deviatkin, 2019). However because this is an unknown in this LCA, the most conservative option of 5 life cycles is chosen.
- The moisture content of the pallets is between 20% and 40%. To be conservative, it is assumed moisture content is 20% and biogenic carbon content is 80% of the pallet weight (Timber Packaging and Pallet Confederation, 2011).
- The polyethylene used to manufacture the FOS bags is 100% virgin material.
- It is reasonable to assume the quantities of additives and UV stabiliser in the polyethylene bags are insignificant to the final footprint.

Environmental impact indicators

An introduction the core environmental impact indicators is provided here. The best-known effect of each indicator is listed in the descriptions and the abbreviations, in brackets, correspond to the labels in the following results tables.

Climate change

(Global Warming Potential)

(GWP-total, GWP-fossil, GWP-biogenic, GWP-luluc)

A measure of greenhouse gas emissions, such as CO_2 and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare. The Global Warming Potential (GWP) is split into three sub indicators: total (GWPt), fossil (GWPf), biogenic (GWPb), and land-use and land-use change (GWPluluc).

Ozone Depletion Potential

(ODP)

Depletion of the ozone leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants. The Ozone Depletion Potential is a measure of air emissions that contribute to the depletion of the stratospheric ozone layer.

Acidification potential

(AP)

Acidification Potential is a measure of emissions that cause acidifying effects to the environment. A molecule's acidification potential indicates its capacity to increase the hydrogen ion (H+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline, and the deterioration of building materials.

Eutrophication Potential

(EP-freshwater, EP-marine, EP-terrestrial)

Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P). In aquatic ecosystems where this term is mostly applied, this typically describes a degradation in water quality. Eutrophication can result in an undesirable change in the type of species that flourish and an increase in the production of biomass. As the decomposition of biomass consumes oxygen, eutrophication may decrease the available oxygen level in the water column and threaten fish in their ability to respire.

Photochemical Ozone Formation Potential (POCP)

Photochemical Ozone Formation Potential gives an indication of the emissions from precursors that contribute to ground level smog formation, mainly ozone (O_3). Ground level ozone may be harmful to human health and ecosystems and may also damage crops. These emissions are produced by the reaction of volatile organic compounds (VOCs) and carbon monoxide in the presence of nitrogen oxides and UV light.

Abiotic Resource Depletion

(ADP-mm, ADP-fossil)

The consumption of non-renewable resources decreases the availability of these resources and their associated functions in the future. Depletion of mineral resources and non-renewable energy resources are reported separately. Depletion of mineral resources is assessed based on total reserves.

Water use (WDP)

Water scarcity is a measure of the stress on a region due to water consumption.

Assessment Indicators

The EN 15804 reference package based on EF 3.1 is used.

For all products, the following indicators are not relevant, hence result in zero values:

- Components for re-use (CRU) is zero since there are none produced.

EN15804+A2
Core environmental impact indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The EN 15804 reference package based on EF 3.1 is used. Since Module C is included in the EPD, the use of Module A1-A3 results without considering the results of Module C is discouraged.

The following tables show the results for one declared unit of product.

Note: As this EPD is typically used within Australasia, the Australasian standard number format is used. This format uses a comma (,) as thousand separator and period (.) as decimal point.

The cradle-to-gate carbon footprint is 0.67 kg CO_2-eq. per kg of product (calculated as A1-A3 with GWP-GHG)

Table 6: Environmental impact (EN15804+A2) covering modules A1-A3, C1-C4 and D.

EN15804+A2 - Environmental indicators			Product stage	Deconstruction	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Indicator	**Abbr.**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Climate change - total	GWP-total	kg CO_2-eq.	6.67E-01	1.00E-04	1.24E-02	5.15E-03	3.13E-03	-2.57E-03
Climate change - fossil	GWP-fossil	kg CO_2-eq.	6.66E-01	1.00E-04	1.24E-02	5.13E-03	3.13E-03	-2.56E-03
Climate change - biogenic	GWP-biogenic	kg CO_2-eq.	4.40E-04	8.20E-09	1.80E-06	9.95E-06	3.23E-07	-4.09E-06
Climate change - land use and land use change	GWP-luluc	kg CO_2-eq.	1.64E-04	1.10E-08	4.69E-06	4.77E-06	1.62E-06	-7.88E-10
Ozone Depletion	ODP	kg CFC 11-eq.	7.24E-09	1.43E-12	1.70E-10	4.11E-11	9.04E-11	-2.35E-10
Acidification	AP	Mole of H+ eq.	2.73E-03	8.86E-07	6.76E-05	3.12E-05	2.22E-05	-2.22E-05
Eutrophication aquatic freshwater	EP-fw	kg P eq.	1.17E-04	4.26E-09	9.69E-07	1.63E-06	2.59E-07	-2.03E-09
Eutrophication aquatic marine	EP-fm	kg N eq.	3.30E-04	4.07E-07	2.71E-05	7.35E-06	8.44E-06	-7.43E-06
Eutrophication terrestrial	EP-tr	Mole of N eq.	6.29E-03	4.45E-06	2.96E-04	8.87E-05	9.22E-05	-8.34E-05
Photochemical ozone formation	POCP	kg NMVOC eq.	2.03E-03	1.32E-06	9.39E-05	2.46E-05	3.30E-05	-2.17E-05
Depletion of abiotic resources- minerals and metals *^	ADP-mm	kg Sb-eq.	1.33E-06	4.60E-11	4.00E-08	2.71E-08	4.96E-09	-1.05E-10
Depletion of abiotic resources - fossil fuels *	ADP-fossil	MJ	6.53E+00	1.31E-03	1.72E-01	6.29E-02	7.67E-02	-3.57E-02
Water use *	WDP	m^3 world equiv.	1.77E-01	4.45E-06	7.34E-04	7.57E-03	2.14E-04	-5.05E-02

* 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.
The variations between A-C results of core environmental indicators are less than 10% for most indicators. The exception is ADP-mm, which has a higher variation.

Results

Additional Environmental impact indicators

Optional environmental impact categories provide further information on environmental impacts.

Table 7: Additional environmental impact indicators covering modules A1-A3, C1-C4 and D.

EN15804+A2 - Additional environmental indicators			Product stage	Deconstruction	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Indicator	**Abbr.**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Climate Change ^	GWP-GHG	kg CO_2-eq.	6.70E-01	1.00E-04	1.24E-02	5.14E-03	3.13E-03	-2.53E-03
Respiratory inorganics	PM	Disease incidences	9.46E-09	0	0	0	0	-4.80E-10
Ionising Radiation - human health ˜	IRP	kBq U235 eq.	1.06E+00	7.46E-07	1.43E-04	4.99E-04	4.89E-05	-3.26E-02
Eco-toxicity (freshwater) °	ETP-fw	CTUh	1.49E+00	2.79E-04	4.59E-02	2.80E-02	1.05E-02	-6.27E-03
Human Toxicity, cancer *°	HTPc	CTUh	1.36E-09	6.66E-13	5.79E-11	4.63E-11	1.41E-11	-7.99E-14
Human Toxicity, non-cancer *°	HTPnc	CTUh	1.80E-08	2.20E-13	1.28E-10	4.29E-11	1.38E-11	-6.09E-12
Land use related impacts / soil quality *°	SQP	Dimensionless	8.70E-01	0	0	0	0	-1.53E-01

^ This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR.

~ 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 some construction materials, is also not measured by this indicator.

° The results of the impact categories land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

* 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.

Resource use indicators

The resource use indicators describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water.

Table 8: Resource use impact indicators covering modules A1-A3, C1-C4 and D.

Inventory indicators - Resource use			Product stage	Deconstruction	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Indicator	**Abbr.**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Renewable primary energy as energy carrier	PERE	MJ	2.86E-01	1.09E-05	2.35E-03	6.09E-03	7.11E-04	-7.43E-04
Renewable primary energy resources as material utilization	PERM	MJ	0	0	0	0	0	0
Total use of renewable primary energy resources	PERT	MJ	2.86E-01	1.09E-05	2.35E-03	6.09E-03	7.11E-04	-7.43E-04
Non-renewable primary energy as energy carrier	PENRE	MJ	5.11E+00	1.31E-03	1.72E-01	6.29E-02	7.67E-02	-3.57E-02
Non-renewable primary energy as material utilization	PENRM	MJ	1.15E+00	0	0	-5.76E-01	0	0
Total use of non-renewable primary energy resources	PENRT	MJ	6.26E+00	1.31E-03	1.72E-01	-5.13E-01	7.67E-02	-3.58E-02
Use of secondary material	SM	kg	8.50E-02	9.35E-07	7.28E-05	6.87E-05	1.93E-05	0
Use of renewable secondary fuels	RSF	MJ	2.28E-03	1.55E-09	8.71E-07	4.64E-07	3.99E-07	0
Use of non-renewable secondary fuels	NRSF	MJ	4.52E+00	1.31E-03	1.72E-01	6.29E-02	7.67E-02	0
Use of net fresh water	FW	m^3	2.24E-03	1.10E-07	2.11E-05	1.80E-04	7.95E-05	-7.01E-04

Waste material and output flow indicators

Waste indicators describe waste generated within the life cycle of the product. Waste is categorised by hazard class, end-of-life fate and exported energy content.

Table 9: Waste categories and output flow indicators covering modules A1-A3, C1-C4 and D.

Inventory indicators - Waste material and output flow			Product stage	Deconstruction	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Indicator	**Abbr.**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	HWD	kg	5.41E-02	2.33E-06	2.95E-04	4.77E-04	8.52E-05	0
Non-hazardous waste disposed	NHWD	kg	3.13E-01	3.02E-05	5.69E-03	8.90E-03	1.95E-03	-2.41E-06
Radioactive waste disposed	RWD	kg	6.30E-07	5.35E-11	1.06E-08	3.33E-08	3.43E-09	-2.18E-07
Components for re-use	CRU	kg	0	0	0	0	0	0
Materials for recycling	MFR	kg	6.40E-05	4.42E-09	1.28E-06	5.00E-01	3.34E-07	0
Materials for energy recovery	MER	kg	1.12E-06	2.40E-11	1.38E-08	5.13E-09	1.50E-09	0
Exported electrical energy	EEE	MJ	7.05E-04	7.35E-08	1.21E-05	4.69E-05	4.67E-06	0
Exported thermal energy	EET	MJ	1.02E-03	3.87E-08	1.49E-05	6.72E-06	2.99E-06	0

Biogenic carbon content

1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 10: Biogenic carbon content covering modules A1-A3, C1-C4 and D.

Inventory indicators - Biogenic carbon content			Product stage	Deconstruction	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Indicator	**Abbr.**	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Biogenic carbon content - product	BCC-prod	kg	0	0	0	0	0	0
Biogenic carbon content - packaging	BCC-pack	kg	3.38E-03	0	0	0	0	0

References

BRANZ. (2024). New Zealand whole-building whole-of-life framework: Development of datasheets to support building life cycle assessment. Retrieved from: www.branz.co.nz/environment-zero-carbon-research/framework/data/

CEN. (2013). EN 15804:2012+A1:2013 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products. Brussels: European Committee for Standardization.

CEN. (2019). EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products. Brussels: European Committee for Standardization.

ECHA. (2024). Candidate List of substances of very high concern for Authorisation. Retrieved from European Chemical Agency: www.echa.europa.eu/candidate-list-table

EPD Australasia. (2024). Instructions of the Australasian EPD Programme v4.2 (published on 2024-04-12). Nelson: EPD Australasia.

EPD International. (2018). PCR 2012:01 Construction products and construction services, version 2.3. Stockholm: EPD International AB.

EPD International. (2024a). PCR 2019:14 Construction Products version 1.3.4 of 2024-04-30 (valid until 2025-06-20). Stockholm: EPD International AB.

EPD International. (2021). General Programme Instructions for the International EPD(r) System. Version 4.0, dated 2021-03-29. Stockholm: EPD International AB.

EPD International. (2024b). General Programme Instructions for the International EPD System. Version 5.0, dated 2024-06-19. Stockholm: EPD International AB.

ISO. (2006a). ISO 14040: Environmental management – Life cycle assessment – Principles and framework. Geneva: International Organization for Standardization.

ISO. (2006b). ISO 14044: Environmental management – Life cycle assessment – Requirements and guidelines. Geneva: International Organization for Standardization.

ISO. (2006c). ISO 14025: Environmental labels and declarations – Type III environmental declarations – Principles and procedures. Geneva: International Organization for Standardization.

Sphera. (2023). Life Cycle Inventory Database 2023 Documentation. Retrieved from Sphera: www.sphera.com/product-sustainability-gabi-data-search/

Wernet, G. B.-R. (2016). The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, 21(9)([online]), 1218–1230.

Programme information

An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules).

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

The results for EN15804+A2 compliant EPDs are not comparable with EN15804+A1 compliant studies as the methodologies are different.

Declaration owner		Parchem Construction Supplies Pty Ltd			
	Web:	www.fosroc.com.au	Email:	info@fosroc.com.au	
	Post:	1956 Dandenong Road, Clayton, Victoria 3168, Australia			
Geographical scope		Australia and New Zealand			
Reference year		01-07-2023 to 30-06-2024			
LCA Accountability		thinkstep pty ltd Barbara Nebel Noa Meron, Rosie Dodd			
	Web:	www.thinkstep-anz.com	Email:	info@thinkstep-anz.com	
	Post:	25 Jubilee Street, South Perth, Western Australia 6151, Australia			
EPD Programme		The International EPD® System			
	Operator:	EPD International AB			
	Web:	www.environdec.com	Email:	info@environdec.com	
	Post:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden			
Regional programme		EPD Australasia			
	Web:	www.epd-australasia.com	Email:	info@epd-australasia.com	
	Post:	EPD Australasia, 315a Hardy Street, Nelson 7010 New Zealand			
	Phone:	NZ: +64 9 889 2909	AU:+61 2 8005 8206		
PCR		CEN standard EN 15804 served as the core Product Category Rules (PCR) PCR 2019.14 Construction Products, version 1.3.4			
PCR review conducted by		The Technical Committee of the International EPD System. See www.environdec.com for a list of members.			
Review chair		The most recent review chair: Claudia Peña, PINDA LCT SpA. The review panel may be contacted via the Secretariat: www.environdec.com/support			
Independent verification of the declaration and data, according to ISO 14025:2006		☐ EPD process certification (Internal) ☑ EPD verification (External)			
Third party verifier		Claudia Peña, Director of PINDA LCT SpA pinda.lct@gmail.com			
Approved by		EPD Australasia Limited			
Procedure for follow-up of data during EPD validity involved third-party verifier		☐ Yes ☑ No			

FOSROC

Parchem Construction Supplies Pty Ltd

1956 Dandenong Road, Clayton VIC 3168
Phone: 1800 812 864
www.fosroc.com.au

Distributed in New Zealand by:

Concrete Plus Ltd

150 Hutt Park Road, Gracefield
Phone: 0800 567 156
www.fosroc.co.nz