



Building
something
great

Pre-mix concrete EPD

Environmental Product Declaration

**New South Wales and Australian Capital Territory
(NSW & ACT) region**



In accordance with ISO 14025 and EN 15804

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-02336 (Version 1.4)

Publication date: 1 April 2021 | **Revised:** 22 May 2024 | **Valid until:** 1 April 2026

Geographical Scope: NSW / ACT – Sydney, Newcastle, Wollongong and Canberra.





Contents





Program information and verification	1
About Boral.....	3
Geographical scope	8
Declared products	10
Pre-mix concrete production	13
ENVISIA® case study	14
Life cycle stages covered by the Life Cycle Assessment (LCA).....	15
Life Cycle Assessment (LCA) methodology	18
Product composition.....	20
Declared unit	21
Environmental indicators	22
Environmental profiles	23
Sydney region.....	24
Newcastle region.....	55
Wollongong region.....	73
Canberra region.....	91
Other environmental information.....	108
Our approach to climate related risks	109
References	111

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 part of ISO 14025, ISO 14040 and ISO 14044 as they enable transparency and comparability between EPDs. This EPD provides environmental indicators for Boral ENVISIA®, ENVIROCRETE®, ENVIROCRETE® PLUS, products for special applications and our normal class of pre-mix concrete products manufactured in Australia. This EPD is a 'cradle-to-gate' declaration covering production of the concrete and its supply chain.

This EPD is verified to be compliant with EN 15804. EPD 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 1.1	The EPD was updated in line with changes in Boral's branding.
Version 1.2	<p>The following edits were made as part of the first annual review:</p> <ul style="list-style-type: none"> • Additional concrete products were added (Thermal Backfill, ASPIRE® high performance concrete and high strength concrete). • Organisation acronyms changed (ISC etc). • Units of measurement changed (MPa to MPa etc). • A summary table of GWP has been added for each region. • The aggregate size removed from the product names in the column headers. • The following editorial errors have been corrected: <ul style="list-style-type: none"> – Various typographical errors upon rebranding (V1.1 – 15/10/2021) and in the initial document (V1.0 – 1/04/2021). – For the Newcastle region (Jesmond plant) results in Tables 23 and 24, the column heading: <ul style="list-style-type: none"> – 'TfNSW B80 50 MPa 20MM PUMP B2 EXPOSURE' should have been labelled as 'TfNSW B80 50 MPa TREMIE B2 EXPOSURE' – 'TfNSW B80 50 MPa 20MM TREMIE B2 EXPOSURE' should have been labelled as 'TfNSW R82 5 MPa HAND / MACHINE PLACED', and – 'TfNSW R82 5 MPa 20MM HAND / MACHINE PLACED' should have also been labelled as 'TfNSW R83 35 MPa HAND / MACHINE PLACED'. • For the Newcastle region, Tables 13 and 17 contained the Sydney data for the equivalent products. • The total number of operating sites for the recycling and cement operations shown on page one were incorrect.
Version 1.3	<p>The following edits were made as part of our second annual review:</p> <ul style="list-style-type: none"> • The branding was updated. • Additional products were added (TfNSW LCC products, ASPIRE® low heat products, ENVIROCRETE® PLUS 65 MPa, 80 MPa products and precast tunnel products). • Minor changes to Sydney ENVIROCRETE® PLUS results (GWP +/-2-3%). • Slight decrease in Sydney ENVISIA® results (GWP up to 6% lower). • Minor changes to some of Newcastle ENVIROCRETE® results (GWP <2% increase).
Version 1.4	<p>Additional products and plants have been added to the EPD as follows:</p> <ul style="list-style-type: none"> • Blockfill products have been added to all regions • Road Authority products have been added to the Newcastle region • Steel Fibrecrete and Low Carbon Steel Fibrecrete products have been added to the Sydney region • The plants at West Gosford and Kincumber have changed from being 'out of scope' to 'in scope'

Reference year for data: 2018-01-01/2018-12-31

CEN standard EN 15804 served as the core PCR

PCR	PCR 2012:01 Construction Products and Construction Services, Version 2.33, 2020-09-18 PCR 2012:01-SUB-PCR-G Concrete and concrete elements, 2020-09-18
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	<input type="checkbox"/> EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)
Procedure for follow-up of data during EPD validity involved third-party verifier	<input type="checkbox"/> No <input checked="" type="checkbox"/> 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.

Boral Concrete has over 200 pre-mix concrete plants around Australia producing a wide range of concrete mixes in metropolitan and country areas.

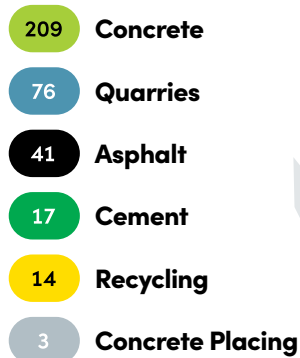
In the New South Wales (NSW) and the Australian Capital Territory (ACT) Boral Concrete supplies pre-mix concrete to all segments of the construction industry including infrastructure, social, commercial and residential construction.

This EPD covers the majority of the concrete products supplied from Boral plants in NSW / ACT.

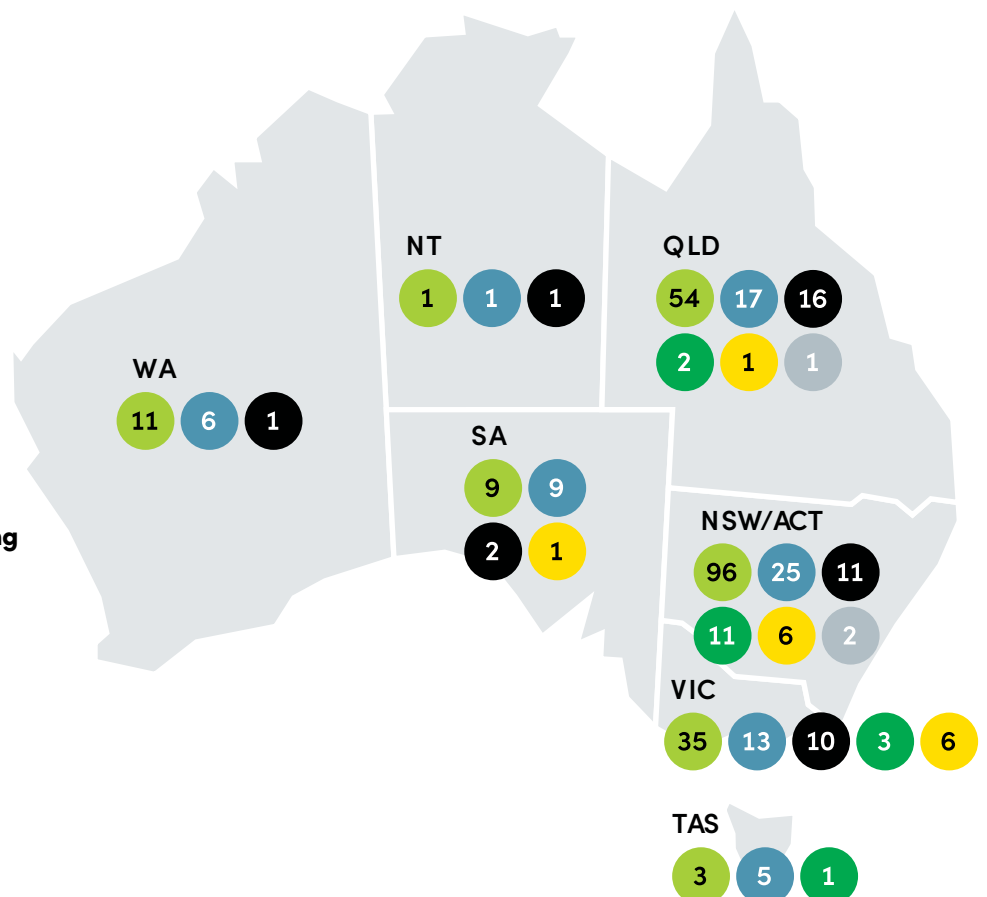
Construction materials Leading integrated network

360

Operating sites*



* 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.

This ensures all of our employees, contractors, partners and communities in which we operate are free from harm, injury and illnesses.

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.

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

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.



About Boral

Sustainability at Boral

We recognise that our commitment and progress in managing sustainability outcomes is vital to our business and meeting the expectations of our customers.

We strive to:

- **Deliver** innovative, superior performing and more sustainable products and solutions that respond to a changing world and better meet our customers' needs
- **Drive** safety performance towards world's best practice and invest in our people to enable them to deliver on our strategy
- **Reduce** our environmental footprint and build our resilience to climate impacts
- **Be** a socially responsible member of the communities in which we operate.

In recent years, we have substantially reshaped our business to respond and adapt to changing commercial, technological, and environmental factors. We have invested in growing our lower carbon concrete products.

We are increasing our investment in innovation to enable us to expand our products and solutions that have a lower carbon footprint and thereby positively contribute to an effective transition to a lower carbon economy.

Boral's ENVISIA® and ENVIROCRETE® / PLUS products underpin this improved sustainable concrete range. We monitor and report on our sustainability performance to drive progress and continuous improvement and are responding to increasing expectations of our customers on the disclosure of our sustainability risks and opportunities.



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

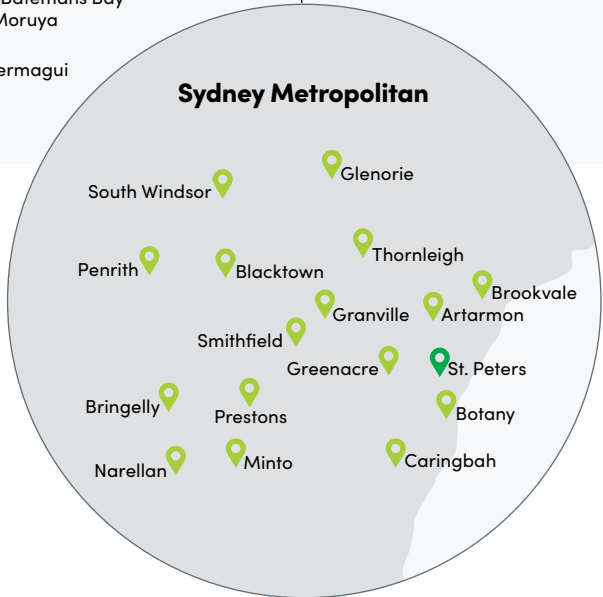
New South Wales / Australian Capital Territory region



Legend

- 📍 Plants that are being modelled in NSW / ACT region EPD.
- 📍 Surrounding plants covered in NSW / ACT region EPD scope.
- 📍 Out of scope for the NSW / ACT region EPD.

The concrete plants considered for this Environmental Product Declaration (EPD) comprise those in the state of New South Wales and the Australian Capital Territory, comprising four sub-regions in the greater Newcastle, Sydney, Wollongong and Canberra areas. Individual plants were assessed for life cycle assessment, and local surrounding similar raw material sources were included in the datasets. These sub regions, and modelled plants, including geographically nearby plants are listed in the following location maps.



- Plants covered by this EPD**
- Boral Concrete St Peters – **Sydney, NSW**
 - Boral Concrete Port Kembla – **Wollongong / South Coast / Illawarra, NSW**
 - Boral Concrete Jesmond – **Newcastle / Hunter / Central Coast, NSW**
 - Boral Concrete Mitchell – **Canberra, ACT**

Geographical scope

New South Wales / Australian Capital Territory region



Boral Concrete St Peters
– Sydney, NSW



Boral Concrete Port Kembla
– Wollongong / South Coast / Illawarra, NSW






Boral Concrete Jesmond
– Newcastle / Hunter, NSW



Boral Concrete Mitchell
– Canberra, ACT

Legend

-  Plants that are being modelled in NSW / ACT region EPD.
-  Surrounding plants covered in NSW / ACT region EPD scope.
-  Out of scope for the NSW / ACT region EPD.

Declared products

Products considered for the NSW / ACT region EPD

The products considered for the EPD fall into three broad categories: **normal class products, lower carbon concrete products and special concrete products**. A brief description of each category is given below, followed by a full list of the products.

1) Normal class concrete products

Normal class concrete products are suitable for general applications and designed to meet the requirements of AS 1379 (Specification and supply of concrete). The normal class concrete products have been grouped according to the cement blend they contain as follows.

Normal class concrete category	Cementitious type
NORMAL CLASS GP BLEND	General Purpose (GP) cement
NORMAL CLASS GP / FA BLEND	General Purpose (GP) cement and Fly Ash (FA)
NORMAL CLASS GP / GGBFS BLEND	General Purpose (GP) cement and Ground Granulated Blast Furnace Slag (GGBFS)
NORMAL CLASS GP / GGBFS / FA BLEND	General Purpose (GP), Ground Granulated Blast Furnace Slag (GGBFS) and Fly Ash (FA)

2) Lower carbon concrete products

The lower carbon concrete products have been designed to have lower portland cement contents and lower embodied carbon contents. They are ideal for projects with sustainability targets including targets based on the Green Building Council of Australia (GBCA) and the Infrastructure Sustainability Council (ISC) rating tools. They have been further categorised according to their portland cement reduction and their performance, as per the sub categories below.

Lower carbon concrete product	Portland cement reduction*	Typical properties
ENVIROCRETE® 30%	≥30%	<ul style="list-style-type: none"> Complies with AS 1379.
ENVIROCRETE® 40%	≥40%	<ul style="list-style-type: none"> Complies with AS 1379.
ENVIROCRETE® PLUS	≥45%	<ul style="list-style-type: none"> Complies with AS 1379. Applicable for Green Star projects. Improved early age strength and drying shrinkage compared to the ENVIROCRETE® products.
ENVISIA®	≥50%	<ul style="list-style-type: none"> Complies with AS 1379. Applicable for Green Star projects. Improved early age strength and drying shrinkage compared to the ENVIROCRETE® and ENVIROCRETE® PLUS products.

* The percentages indicate the typical portland cement reduction against default concrete mixes as defined in the Green Star and ISC Rating tools by the Green Building Council of Australia (GBCA) and the Infrastructure Sustainability Council (ISC) respectively.

Declared products

ENVIROCRETE® concrete (30% and 40%)

Boral's ENVIROCRETE® concrete is a lower carbon concrete product which complies with AS 1379.

It contains supplementary cementitious materials to reduce the portland cement content. ENVIROCRETE® concrete is available with two levels of portland cement reduction. ENVIROCRETE® 30% has a minimum portland cement reduction of 30% compared to the GBCA and ISC reference case and ENVIROCRETE® 40% has a minimum portland cement reduction of 40% when compared to the GBCA and ISC reference case. ENVIROCRETE® 30% and 40% are ideal for general applications where high-performance concrete is not required.

ENVIROCRETE® PLUS concrete

Boral's ENVIROCRETE® PLUS concrete is a lower carbon concrete product which complies with AS 1379.

It contains supplementary cementitious materials to reduce the portland cement and the minimum reduction in portland cement compared to the GBCA and ISC reference case is 45%. ENVIROCRETE® PLUS also has enhanced engineering properties compared to the ENVIROCRETE® range. The early age strength and drying shrinkage are superior to ENVIROCRETE®.

ENVISIA® concrete

Boral's ENVISIA® concrete is a lower carbon concrete product which complies with AS 1379 and has excellent engineering properties. It contains supplementary cementitious materials to reduce the portland cement and the minimum portland cement reduction compared to the GBCA and ISC reference case is 50%. ENVISIA® combines a proprietary cement technology (ZEP®) which gives it good early age strength, low shrinkage characteristics and excellent durability characteristics in a marine environment. An overview of the sustainability, durability, engineering and architectural properties are given below.

Lower carbon

- ENVISIA® has a low portland cement content and is suitable for projects seeking to maximise the number of green star points from concrete.
- ENVISIA® has a lower carbon content and is suitable for projects seeking a rating with the Green Building Council of Australia (GBCA) or the Infrastructure Sustainability Council (ISC).

Workability

- ENVISIA® can be placed, pumped and finished like conventional concrete.

Superior engineering properties

- ENVISIA® will achieve early-age strength equivalent to conventional concrete mixes with higher portland cement content (e.g. post-tensioned and precast concrete).
- ENVISIA® has 20 per cent greater flexural strength compared to conventional concrete of the same grade.
- ENVISIA® achieves up to 50 per cent reduction in shrinkage when compared to conventional sustainable concrete mixes.

Superior durability

- ENVISIA® provides improved durability, through greater protection to steel reinforcement against chloride induced corrosion.
- ENVISIA® has improved sulphate and acid resistance properties.
- ENVISIA® mitigates the potential expansion due to alkali aggregate reactivity.

Architectural presence

- ENVISIA® can achieve a range of architectural benefits because of its good off-form finish and lighter colour.
- ENVISIA®'s lighter colour will enhance the use of coloured oxides.

3) Concrete products for special applications

Boral's special concrete products have been designed to meet specific project requirements in addition to the requirements of AS 1379. They include products that have been designed for infrastructure projects, multi-residential buildings, commercial buildings and civil works.

Declared products

Products covered by this Environmental Product Declaration (EPD)

The products covered in the EPD are listed below. The environmental impacts of products not referenced in the EPD can be provided on request. Boral is developing an environmental impact calculator allowing us to provide environmental profiles for virtually any mix design from any of our concrete plants in Australia. We intend to have the calculator independently verified in line with the same standards this EPD is based on, so that the results are of similar standing.

1) Normal class concrete products

- NORMAL CLASS GP BLEND 20MPa
- NORMAL CLASS GP BLEND 25MPa
- NORMAL CLASS GP BLEND 32MPa
- NORMAL CLASS GP BLEND 40MPa
- NORMAL CLASS GP BLEND 50MPa
- NORMAL CLASS GP/FA BLEND 20MPa
- NORMAL CLASS GP/FA BLEND 25MPa
- NORMAL CLASS GP/FA BLEND 32MPa
- NORMAL CLASS GP/FA BLEND 40MPa
- NORMAL CLASS GP/FA BLEND 50MPa
- NORMAL CLASS GP/GGBFS BLEND 20MPa
- NORMAL CLASS GP/GGBFS BLEND 25MPa
- NORMAL CLASS GP/GGBFS BLEND 32MPa
- NORMAL CLASS GP/GGBFS BLEND 40MPa
- NORMAL CLASS GP/GGBFS BLEND 50MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 20MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 25MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 32MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 40MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 50MPa

2) Lower carbon concrete products for special applications

- ENVIROCRETE® 30% 20MPa
- ENVIROCRETE® 30% 25MPa
- ENVIROCRETE® 30% 32MPa
- ENVIROCRETE® 30% 40MPa
- ENVIROCRETE® 30% 50MPa
- ENVIROCRETE® 40% 20MPa
- ENVIROCRETE® 40% 25MPa
- ENVIROCRETE® 40% 32MPa
- ENVIROCRETE® 40% 40MPa
- ENVIROCRETE® 40% 50MPa
- ENVIROCRETE® PLUS 20MPa
- ENVIROCRETE® PLUS 25MPa
- ENVIROCRETE® PLUS 32MPa
- ENVIROCRETE® PLUS 40MPa
- ENVIROCRETE® PLUS 50MPa
- ENVIROCRETE® PLUS 65MPa
- ENVIROCRETE® PLUS 80MPa
- ENVISIA® 20MPa
- ENVISIA® 25MPa
- ENVISIA® 32MPa
- ENVISIA® 40MPa
- ENVISIA® 50MPa
- ENVISIA® 65MPa
- ENVISIA® 80MPa

3) Concrete products for special applications

- POST TENSIONED 40MPa 22@3
- POST TENSIONED 40MPa 22@4
- POST TENSIONED 40MPa 22@5

- HIGH SLUMP 50MPa
- HIGH SLUMP 65MPa
- HIGH SLUMP 80MPa
- HIGH WORKABILITY 65MPa
- TREMIE 40MPa
- TREMIE 50MPa
- TREMIE 65MPa
- SHOTCRETE 40MPa
- SHOTCRETE 40MPa 35KG STEEL FIBRE
- KERB MACHINE 25MPa
- KERB MACHINE 32MPa
- NO FINES 6:1
- STABILISED SAND 14:1
- STABILISED SAND 4:1
- STABILISED SAND 8:1
- THERMAL FTB 45
- THERMAL FTB 60
- THERMAL FTB 115
- TfNSW B80 40MPa 20MM PUMP B1 EXPOSURE
- TfNSW B80 40MPa 20MM PUMP B2 EXPOSURE
- TfNSW B80 40MPa 20MM TREMIE B2 EXPOSURE
- TfNSW B80 50MPa 10MM TREMIE CFA C1 EXPOSURE
- TfNSW B80 50MPa 20MM PUMP B2 EXPOSURE
- TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE
- TfNSW R82 5MPa 20MM HAND/MACHINE PLACE
- TfNSW R83 35MPa 20MM HAND/MACHINE PLACE
- TFNSW LCC B80 40MPa B1
- TFNSW LCC B80 40MPa B2
- TFNSW LCC B80 50MPa B1
- TFNSW LCC B80 50MPa B2
- TFNSW LCC B80 60MPa B2/C1
- TFNSW LCC B80 65MPa B2/C1
- HIGH WORKABILITY S65; (HWC) 10; 465MM SPREAD C1
- ROAD AUTHORITY RA60 10 BSPR
- ROAD AUTHORITY RA65 10 BSPR
- ROAD AUTHORITY RA50 20 HWC 475
- LOW HEAT S65 SWC
- LOW HEAT S80 SWC
- LOW HEAT S100@90D SWC
- SPECIAL 65MPa PRECAST TUNNEL SEGMENTS
- SPECIAL 65MPa PRECAST TUNNEL SEGMENTS (30% SCM)
- ENVISIA® 50MPa PRECAST TUNNEL SEGMENTS
- ASPIRE® 40GPa/65MPa
- ASPIRE® 40GPa/65MPa HIGH EARLY
- ASPIRE® 42GPa/50MPa
- ASPIRE® 45GPa/80MPa
- ASPIRE® 45GPa/80MPa HIGH EARLY
- ASPIRE® 45GPa/80MPa LOW HEAT
- ASPIRE® 45GPa/80MPa LATE AGE/LOW HEAT
- ASPIRE® 46GPa/65MPa
- ASPIRE® 47GPa/80MPa

- ASPIRE® 50GPa/100MPa
- ASPIRE® 50GPa/100MPa HIGH EARLY
- ASPIRE® 50GPa/100MPa LOW HEAT
- ASPIRE® 50GPa/100MPa LATE AGE/LOW HEAT
- HIGH STRENGTH 100MPa @ 90 DAYS
- HIGH STRENGTH 120MPa @ 90 DAYS
- BLOCKFILL 20MPa GP/FA BLEND
- BLOCKFILL 25MPa GP/FA BLEND
- BLOCKFILL 32MPa GP/FA BLEND
- BLOCKFILL 40MPa GP/FA BLEND
- BLOCKFILL 20MPa GP/GGBFS/FA BLEND
- BLOCKFILL 25MPa GP/GGBFS/FA BLEND
- BLOCKFILL 32MPa GP/GGBFS/FA BLEND
- BLOCKFILL 40MPa GP/GGBFS/FA BLEND

4) Fibrecrete products

- FIBRE 32MPa 20KG STEEL
- FIBRE 40MPa 20KG STEEL
- FIBRE 50MPa 20KG STEEL
- FIBRE 32MPa 25KG STEEL
- FIBRE 40MPa 25KG STEEL
- FIBRE 50MPa 25KG STEEL
- FIBRE 32MPa 30KG STEEL
- FIBRE 40MPa 30KG STEEL
- FIBRE 50MPa 30KG STEEL

5) Lower carbon fibrecrete products

- ENVIROCRETE® 30% 32MPa 20KG STEEL FIBRE
- ENVIROCRETE® 30% 40MPa 20KG STEEL FIBRE
- ENVIROCRETE® 30% 50MPa 20KG STEEL FIBRE
- ENVIROCRETE® 30% 32MPa 25KG STEEL FIBRE
- ENVIROCRETE® 30% 40MPa 25KG STEEL FIBRE
- ENVIROCRETE® 30% 50MPa 25KG STEEL FIBRE
- ENVIROCRETE® 30% 32MPa 30KG STEEL FIBRE
- ENVIROCRETE® 30% 40MPa 30KG STEEL FIBRE
- ENVIROCRETE® 30% 50MPa 30KG STEEL FIBRE
- ENVIROCRETE® PLUS 32MPa 20KG STEEL FIBRE
- ENVIROCRETE® PLUS 40MPa 20KG STEEL FIBRE
- ENVIROCRETE® PLUS 50MPa 20KG STEEL FIBRE
- ENVIROCRETE® PLUS 32MPa 25KG STEEL FIBRE
- ENVIROCRETE® PLUS 40MPa 25KG STEEL FIBRE
- ENVIROCRETE® PLUS 50MPa 25KG STEEL FIBRE
- ENVIROCRETE® PLUS 32MPa 30KG STEEL FIBRE
- ENVIROCRETE® PLUS 40MPa 30KG STEEL FIBRE
- ENVIROCRETE® PLUS 50MPa 30KG STEEL FIBRE
- ENVISIA® 32MPa 20KG STEEL FIBRE
- ENVISIA® 40MPa 20KG STEEL FIBRE
- ENVISIA® 50MPa 20KG STEEL FIBRE
- ENVISIA® 32MPa 25KG STEEL FIBRE
- ENVISIA® 40MPa 25KG STEEL FIBRE
- ENVISIA® 50MPa 25KG STEEL FIBRE
- ENVISIA® 32MPa 30KG STEEL FIBRE
- ENVISIA® 40MPa 30KG STEEL FIBRE
- ENVISIA® 50MPa 30KG STEEL FIBRE

Pre-mix concrete production

Concrete production is the process of combining water, aggregates, cementitious binders and additives. These different ‘ingredients’ are mixed at a specialised facility known as a ‘batching’ plant.

The batching plant stores the ingredients in cement silos, aggregate bins and admixture tanks and uses calibrated weigh scales and flow meters to accurately weigh the ingredients. The ingredients are then mixed in a transit mixer compliant with item C3 of AS 1379 to produce concrete which is delivered to the project.

Depending on the proposed application of the final product, the concrete may contain other ingredients such as colour oxides and fibres and the production process may include heaters or chillers. Concrete production is time-sensitive, once the ingredients are mixed, workers must put the concrete in place before it loses workability.



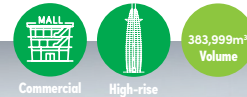
ENVISIA® Case study



Building something great

Case study

ENVISIA® Concrete



Crown Sydney – Barangaroo

Project

Crown Sydney is a major highlight of the 22ha Barangaroo project, which is an innovative redevelopment transforming a former container terminal alongside Sydney Harbour into a multi-faceted space. Crown Sydney features a casino, luxury apartments and the city's first six-star hotel.

Concrete was supplied from a bespoke on-site batch plant that pumped into four separate lines to cover the entire site. Boral's project involvement also extends to concrete placement through De Martin and Gasparini.

Overview

Customer

Lend Lease

Project name

Crown – Barangaroo

Segment

Commercial

Location

Sydney CBD, NSW

Concrete offered

ENVISIA®
(flatwork and infills)

What was the customer looking for:

- **A Boral concrete solution** that assists the customer in meeting its ambitious sustainability goal, which was a **20 percent reduction in embodied carbon across the entire site** when compared to standard methods of construction.
- **A Boral tailored concrete mix design** to optimise results under demanding pumping conditions and continuous high volume pours within a congested Sydney Harbour site layout.
- **A Boral built tailored on-site batch plant** to substantially reduce traffic movements – in line with the project's safety and sustainability goals.
- **A Boral developed centralised pumping system** to substantially reduce the need for agitators on site.

What could Boral offer:

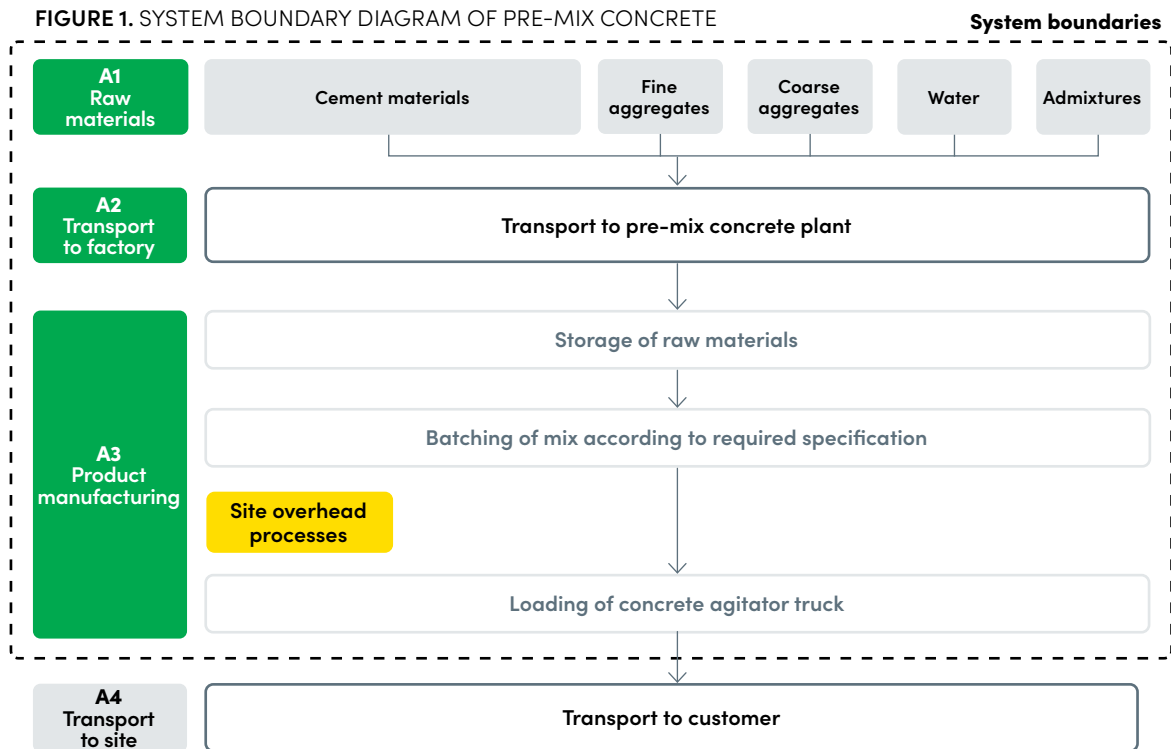
- **Boral supplied a 383,000m³ total concrete volume** across Barangaroo South.
- **Boral supplied ENVISIA® lower carbon concrete¹ and Green Star 3² customised concrete mixes** to support world leading sustainable targets.
- **Boral's purpose built on-site concrete batch plant which:**
 - substantially reduced traffic movements to site
 - was designed for a demanding pumping environment
 - supplied directly into four concrete pumps, sending concrete up to 300 lineal metres before pumping up into the towers.
- **Boral provided some unique long line concrete mix options** to solve difficult pumping environments over long distances into high towers.
- **An Australian first for Boral in commercial/residential construction** – agitators were not needed for a majority of the pours.
- **Boral eliminated testing cylinders**, for early age strength through temperature cylinders.

For more information please visit boral.com.au/lcc

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Life cycle stages covered by the Life Cycle Assessment (LCA)

This EPD covers the cradle-to-gate life cycle stages with modules C and D (A1-A3), as per the diagram below. Downstream stages have not been included.



Raw material stage (A1)

All raw materials used in the production of Boral's normal class concrete, lower carbon concrete and special concrete products comply with the following standards as required by AS 3600 Concrete Structures (SA 2018) and AS 1379 Specification and Supply of Concrete (SA 2007 / R2017):

- **AS 3972:** General purpose and blended cements
- **AS 3582.1** Supplementary cementitious materials Part 1: Fly Ash
- **AS 3582.2** Supplementary cementitious materials Part 2: Slag – Ground granulated blast furnace
- **AS 2758.1** Aggregates and rock for engineering purposes Part 1: Concrete Aggregates
- **AS 1478.1** Chemical admixtures for concrete, mortar and grout

Life cycle stages covered by the Life Cycle Assessment (LCA)

Transportation stage (A2)

Raw materials are typically transported to our sites via rigid trucks. Coarse aggregates, manufactured sands and natural sands are sourced from our network of quarries. Shrinkage Ltd Cement (GP), ENVIROMENT® slag cement and ZEP® slag cement is supplied by Boral Cement from their facilities in Berrima and Maldon. Fly ash is sourced from the power stations at Eraring, Mount Piper and Bayswater.

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
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	MND	MND	MND	MND	MND	MND	MND

✓ = module is included in this study MND = 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 stages covered by the Life Cycle Assessment (LCA)

Manufacturing stage (A3)

The manufacturing process of Boral's normal class concrete, lower carbon concrete and special concrete products is by mixing concrete constituents comprising of cement and supplementary cementitious materials (SCM) (AS 3972/AS 3582.1, 2, 3), and fine / coarse aggregates (AS 2758.1), plus admixtures / additives (AS 1478.1) and water (AS 1379) directly in the truck referred to as the dry batch method, or in selected locations pre-mixing in a wet mix fashion, before delivery by agitator truck.

The entire process is covered under AS 1379 Specification and Supply of concrete and verified by third party under ISO9001. This manufacturing stage (A3) includes activities associated with sourcing and delivery of individual concrete constituents, up to the point of mixing at the batch plant, but not including delivery and placement of concrete at the project location. This is typically described as the Cradle (A1) to Gate (A3) life cycle.



Life Cycle Assessment (LCA) methodology

Background data

Boral has supplied primary data from key quarries, cement production facilities and concrete production sites. Four concrete production sites (St Peters, ACT / Mitchell, Port Kembla and Jesmond) provided primary data. The LCA shows that these sites are representative for key regions in NSW / ACT. Data for admixtures have been sourced from EPDs published in December 2015 by EFCA (European Federation of Concrete Admixtures Associations) (EFCA 2015a–e). Background data (e.g. for energy and transport processes, blast furnace slag and fly ash) have predominantly been sourced from AusLCI and the AusLCI shadow database.

The NSW quarry data, cement production data and concrete production data have been collected for calendar year 2018. The vast majority of 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.

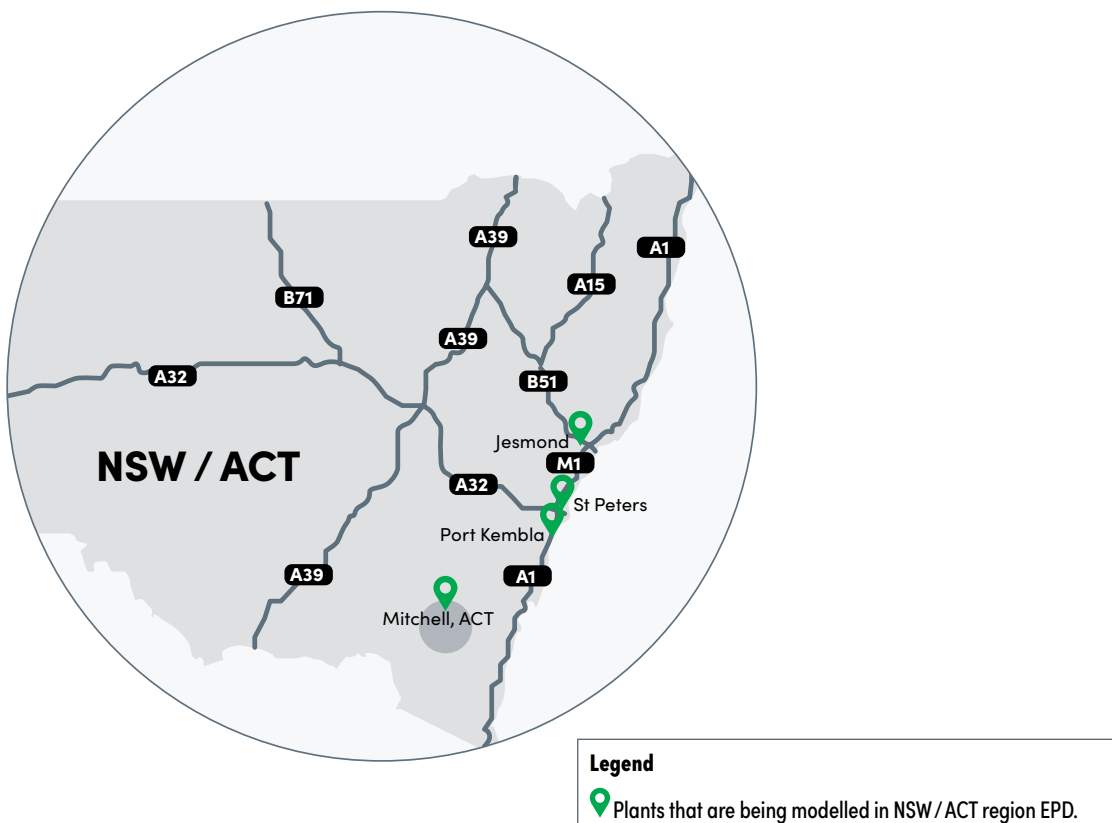
Methodological choices have been applied in line with EN 15804 (CEN 2013); deviations have been recorded.

Representative plants in each region

Boral operates 90 concrete plants in NSW and the ACT. This EPD covers a sub-section of our concrete plants located in four key regions:

- 1 Jesmond for Newcastle / Hunter Valley / Central Coast (NSW)
- 2 St Peters for Sydney (NSW)
- 3 Port Kembla for Wollongong / Illawarra / South Coast / Southern Highlands (NSW)
- 4 Mitchell for Canberra (ACT)

Our background LCA report shows that a single plant is representative for surrounding plants that have similar supply chains and mix designs.



Life Cycle Assessment (LCA) methodology

Allocation

The key material production processes that require allocation are:

Pre-mix concrete

Boral manufactures a range of pre-mix concrete products at its sites. Energy use for concrete production has been allocated to the products based on a volume basis (total m3 of pre-mix concrete products).

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.

Aggregates

Aggregates are produced through crushing of rock, which is graded in different sizes. The energy required for the crushing and screening does not differentiate between products. Therefore, aggregate production (including manufactured sand) has been allocated based on the mass of product.

Blast Furnace Slag (BFS)

BFS is a by-product from steel-making. 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 using economic allocation.

Fly ash

Fly ash is a by-product from coal-fired power plants. We have used the AusLCI data for fly ash, in which all environmental impacts of the power plant are allocated to the main product: electricity. Fly ash has only received the burdens of transport to our sites.

The allocation assumptions were checked using sensitivity analysis, which showed that the allocation of fly ash can have an impact on the LCA results if impacts of electricity production are assigned to fly ash.

Cut-off criteria

The contribution of capital goods (production equipment and infrastructure) and personnel is excluded, as these processes are non-attributable and they contribute less than 10% to w-GHG.

The amount of packaging used for admixtures is well below the materiality cut-off and these materials have been excluded.

Key assumptions

Admixture data

Are based on generic AusLCI data for organic and inorganic chemicals.

Fly ash

Is considered a by-product of electricity generation that comes without prior environmental impacts. This allocation decision can have a significant effect on the environmental profile of products that use fly ash.

Blast Furnace Slag (BFS)

Receives some environmental impacts from pig iron production. This allocation decision has an effect on the environmental profile of products that use Ground-Granulated Blast Furnace Slag (GGBFS).

Water consumption

Is not measured consistently across quarries. We have used AusLCI water consumption data per tonne of coarse and fine aggregates instead.

Product composition

Content declaration (% by weight)

TABLE 2. NSW / ACT REGION PRODUCT COMPOSITIONS

Constituent (% by weight)	NORMAL CLASS GP BLEND	NORMAL CLASS GP / FA BLEND	NORMAL CLASS GP / GGBFS BLEND	NORMAL CLASS GP / GGBFS / FA BLEND	ENVIROCRETE®
General purpose cement	11–22%	8–20%	7–13%	5–17%	7–18%
Ground granulated blast furnace slag	–	–	4–9%	2–5%	0–4%
Fly ash	–	3–4%	–	3–5%	2–5%
Silica fume	–	–	–	–	–
Coarse aggregate	38–50%	38–50%	38–50%	38–50%	38–50%
Manufactured sand	8–38%	8–38%	8–38%	8–38%	8–38%
Natural sand	0–38%	0–38%	0–38%	0–38%	0–38%
Admixtures	<0.15%	<0.15%	<0.15%	<0.15%	<0.15%
Water	6–9%	6–9%	6–9%	6–9%	6–9%

TABLE 3. NSW / ACT REGION PRODUCT COMPOSITION (CONTINUED)

Constituent (% m / m)	ENVIROCRETE® PLUS*	ENVISIA®	TfNSW	SPECIAL
General purpose cement	7–14%	5–17%	3–20%	1–24%
Ground granulated blast furnace slag	3–11%	8–12%	0–8%	0–10%
Fly ash	0–3%	0–3%	2–7%	0–6%
Silica fume	–	–	–	<1%
Coarse aggregate	38–50%	36–50%	30–50%	0–67%
Manufactured sand	8–38%	8–38%	8–38%	0–88%
Natural sand	0–38%	0–38%	0–38%	0–88%
Admixtures	<0.3%	<0.6%	<0.3%	<0.4%
Steel Fibres	–	–	–	<1.5%
Water	6–9%	6–9%	6–9%	3–9%

*May include Zep® technology.

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).

Pre-mix concrete is supplied in bulk; packaging materials are not relevant for the products contained in this EPD.

Boral's pre-mix concrete does not contain any biogenic carbon.

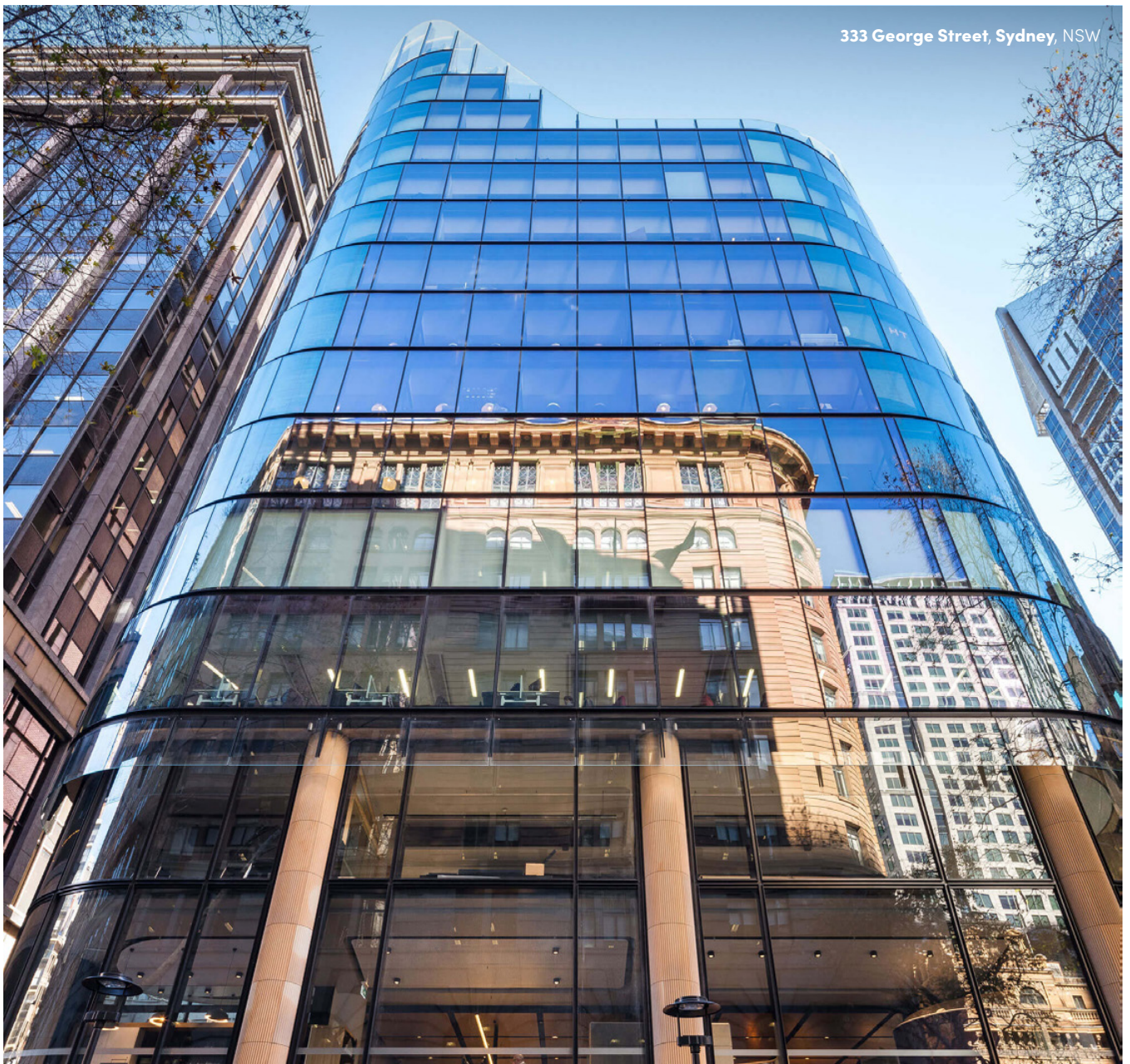
Declared unit

The background LCA serves as the foundation for this EPD. An LCA analyses the environmental processes in the value chain of a product. It provides a comprehensive evaluation of all upstream (and some downstream) material and energy inputs and outputs. The results are provided for a range of environmental impact categories, in line with EN 15804+A2.

Pre-mix concrete is available in various strength grades and with characteristics that are specifically designed for each application. The declared unit that covers all of the products is: **One cubic metre (m³) of pre-mix concrete (as ordered by client) with a given strength grade and identifying characteristics**. This declared unit has been adapted from the C-PCR (Envirodec 2020b).

All results are presented per declared unit and cover the A1-A3 life cycle stages (cradle-to-gate).

The product code for pre-mix concrete is UN CPC 375 (articles of concrete, cement and plaster) and ANZSIC 20330 (Concrete – ready mixed – except dry mix).



Environmental indicators

TABLE 4. CORE IMPACT CATEGORIES INCLUDED IN THIS ASSESSMENT

Impact category	Acronym	Unit
Global warming potential	GWP	kg CO ₂ equivalents
Depletion potential of the stratospheric ozone layer	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 ₂ H ₄ equivalents
Abiotic depletion potential for mineral elements*	ADPE	kg Sb equivalents
Abiotic depletion potential for fossil fuels*	ADPF	MJ

* 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.

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

Environmental profiles

The cradle-to-gate (module A1-A3) environmental profiles and environmental parameters of each product group are expressed per m³ of pre-mix concrete (volume as ordered by the client).

Changes from the previous EPD

The results for the Sydney region in this EPD can vary from the results in our previously published Sydney NSW Pre-mix Concrete EPD (S-P-02048). These changes are due to changes in our mix designs from the time of providing Sydney Pre-mix Concrete EPD mix designs until the current EPD, the content of many of the mixes has changes (in particular the portland cement in the ENVISIA[®] products has been reduced).

Limitations

The results of this study and the EPD are valid for Boral products only. Products from other manufacturers will likely have different impacts due to differences in mix designs, supply chains and manufacturing processes. The main limitations of the LCA results are found in the parameter results, which are highly dependent on background data.

The environmental parameters are based on the life cycle inventory.

There is some ambiguity around their presentation, and issues to note include:

- hazardous waste disposal (HWD) is derived from background LCI data.
- non-hazardous waste disposal (NHWD) is derived from background LCI data.
- radioactive waste disposal (RWD) is derived from background LCI data. Radioactive waste is only coming through the EPD data for admixtures, unless the life cycle contains clinker manufactured overseas.

Variation (A1-A3) per impact category

The results of the Sydney (NSW) EPD clearly showed that the GHG emissions of the Sydney (NSW) concrete products are not materially different between the manufacturing sites, with variations generally being less than ±1%. The largest variation (4%) is found in stabilised sand 14:1, as this is the product with the smallest footprint. start2see has analysed the variation for the other mandatory indicators, and can confirm that the variation stays well within the ±10% range as required by the PCR (Envirodec 2020a) for most indicators.

The variations in the Sydney (NSW) results are larger than ±10% for ozone layer depletion (ODP) and photochemical oxidant creation (POCP), which is caused by minor differences in aggregate transport.

Aggregates from Peppertree Quarry are transported by rail directly to the St Peters concrete plant. For other concrete plants, aggregates require an additional 20 km (approximately) transport by truck from the receiving rail depot to the concrete plant. We have added an additional truck transport process (30 km per m³ of concrete) to ensure the St Peters results are representative for the wider Sydney region.

Without this additional transport leg, the St Peters results for ODP and POCP would be up to 30% lower. The fact that relatively minor changes in the supply chain have such an impact on these indicators, suggests that the emissions are coming from a low (absolute) base.

We believe it is reasonable to use a single plant per region as representative for the wider region.



Sydney region

Environmental profiles and parameters

Product table list

Sydney region

In each region, we start with presenting a summary of the cradle-to-gate carbon footprint (GWP summary) of our concrete mixes.

Normal class concrete products

Table no. 1 and 2.....28

- NORMAL CLASS GP BLEND 20MPa
- NORMAL CLASS GP BLEND 25MPa
- NORMAL CLASS GP BLEND 32MPa
- NORMAL CLASS GP BLEND 40MPa
- NORMAL CLASS GP BLEND 50MPa

Table no. 3 and 4.....29

- NORMAL CLASS GP/FA BLEND 20MPa
- NORMAL CLASS GP/FA BLEND 25MPa
- NORMAL CLASS GP/FA BLEND 32MPa
- NORMAL CLASS GP/FA BLEND 40MPa
- NORMAL CLASS GP/FA BLEND 50MPa

Table no. 5 and 6.....30

- NORMAL CLASS GP/GGBFS BLEND 20MPa
- NORMAL CLASS GP/GGBFS BLEND 25MPa
- NORMAL CLASS GP/GGBFS BLEND 32MPa
- NORMAL CLASS GP/GGBFS BLEND 40MPa
- NORMAL CLASS GP/GGBFS BLEND 50MPa

Table no. 7 and 8.....31

- NORMAL CLASS GP/GGBFS/FA BLEND 20MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 25MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 32MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 40MPa
- NORMAL CLASS GP/GGBFS/FA BLEND 50MPa

Lower carbon concrete products

Table no. 9 and 10.....32

- ENVIROCRETE® 30% 20MPa
- ENVIROCRETE® 30% 25MPa
- ENVIROCRETE® 30% 32MPa
- ENVIROCRETE® 30% 40MPa
- ENVIROCRETE® 30% 50MPa

Table no. 11 and 12.....33

- ENVIROCRETE 40% 20MPa
- ENVIROCRETE 40% 25MPa
- ENVIROCRETE 40% 32MPa
- ENVIROCRETE 40% 40MPa
- ENVIROCRETE 40% 50MPa

Table no. 13 and 14.....34

- ENVIROCRETE® PLUS 20MPa
- ENVIROCRETE® PLUS 25MPa
- ENVIROCRETE® PLUS 32MPa
- ENVIROCRETE® PLUS 40MPa
- ENVIROCRETE® PLUS 50MPa
- ENVIROCRETE® PLUS 65MPa
- ENVIROCRETE® PLUS 80MPa

Table no. 15 and 16.....35

- ENVISIA® 20MPa
- ENVISIA® 25MPa
- ENVISIA® 32MPa
- ENVISIA® 40MPa
- ENVISIA® 50MPa
- ENVISIA® 65MPa
- ENVISIA® 80MPa

Concrete for special applications

Table no. 17 and 18..... 36

- POST TENSIONED 40MPa 22@3
- POST TENSIONED 40MPa 22@4
- POST TENSIONED 40MPa 22@5
- HIGH SLUMP 50MPa
- HIGH SLUMP 65MPa
- HIGH SLUMP 80MPa

Table no. 19 and 20..... 37

- TREMIE 40MPa
- TREMIE 50MPa
- TREMIE 65MPa
- SHOTCRETE 40MPa
- SHOTCRETE 40MPa 35KG STEEL FIBRE
- KERB MACHINE 25MPa
- KERB MACHINE 32MPa

Table no. 21 and 22.....38

- NO FINES 6:1
- STABILISED SAND 14:1
- STABILISED SAND 4:1
- STABILISED SAND 8:1
- THERMAL FTB 45
- THERMAL FTB 60

Table no. 23 and 24.....39

- TfNSW B80 40MPa 20MM PUMP B1 EXPOSURE
- TfNSW B80 40MPa 20MM PUMP B2 EXPOSURE
- TfNSW B80 40MPa 20MM TREMIE B2 EXPOSURE
- TfNSW B80 50MPa 10MM TREMIE CFA C1 EXPOSURE

Table no. 25 and 26.....40

- TfNSW B80 50MPa 20MM PUMP B2 EXPOSURE
- TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE
- TfNSW R82 5MPa 20MM HAND/MACHINE PLACE
- TfNSW R83 35MPa 20MM HAND/MACHINE PLACE

Table no. 27 and 28.....41

- TfNSW LCC B80 40MPa B1
- TfNSW LCC B80 40MPa B2
- TfNSW LCC B80 50MPa B1
- TfNSW LCC B80 50MPa B2
- TfNSW LCC B80 60MPa B2/C1
- TfNSW LCC B80 65MPa B2/C1

Table no. 29 and 30.....42

- LOW HEAT S65 SWC
- LOW HEAT S80 SWC
- LOW HEAT S100@90D SWC
- SPECIAL 65MPa PRECAST TUNNEL SEGMENTS
- SPECIAL 65MPa PRECAST TUNNEL SEGMENTS (30% SCM)
- ENVISIA 50MPa PRECAST TUNNEL SEGMENTS

Table no. 31 and 32.....43

- ASPIRE® 40GPa/65MPa
- ASPIRE® 40GPa/65MPa HIGH EARLY
- ASPIRE® 42GPa/50MPa
- ASPIRE® 45GPa/80MPa
- ASPIRE® 45GPa/80MPa HIGH EARLY
- ASPIRE® 45GPa/80MPa LOW HEAT
- ASPIRE® 45GPa/80MPa LATE AGE/LOW HEAT

Table no. 33 and 34.....44

- ASPIRE® 46GPa/65MPa
- ASPIRE® 47GPa/80MPa
- ASPIRE® 50GPa/100MPa
- ASPIRE® 50GPa/100MPa HIGH EARLY
- ASPIRE® 50GPa/100MPa LOW HEAT
- ASPIRE® 50GPa/100MPa LATE AGE/LOW HEAT
- HIGH STRENGTH 100MPa @ 90 DAYS
- HIGH STRENGTH 120MPa @ 90 DAYS

Table no. 35 and 36.....45

- BLOCKFILL 20MPa GP/FA BLEND
- BLOCKFILL 25MPa GP/FA BLEND
- BLOCKFILL 32MPa GP/FA BLEND
- BLOCKFILL 40MPa GP/FA BLEND

Table no. 37 and 38.....46

- BLOCKFILL 20MPa GP/GGBFS/FA BLEND
- BLOCKFILL 25MPa GP/GGBFS/FA BLEND
- BLOCKFILL 32MPa GP/GGBFS/FA BLEND
- BLOCKFILL 40MPa GP/GGBFS/FA BLEND

Table no. 39 and 40..... 47

- FIBRE 32MPa 20KG STEEL
- FIBRE 40MPa 20KG STEEL
- FIBRE 50MPa 20KG STEEL
- FIBRE 32MPa 25KG STEEL

Table no. 41 and 42.....48

- FIBRE 40MPa 25KG STEEL
- FIBRE 50MPa 25KG STEEL
- FIBRE 32MPa 30KG STEEL
- FIBRE 40MPa 30KG STEEL
- FIBRE 50MPa 30KG STEEL

Table no. 43 and 44.....49

- ENVIROCRETE® 30% 32MPa 20KG STEEL FIBRE
- ENVIROCRETE® 30% 40MPa 20KG STEEL FIBRE
- ENVIROCRETE® 30% 50MPa 20KG STEEL FIBRE
- ENVIROCRETE® 30% 32MPa 25KG STEEL FIBRE
- ENVIROCRETE® 30% 40MPa 25KG STEEL FIBRE

Table no. 45 and 46.....50

- ENVIROCRETE® 30% 50MPa 25KG STEEL FIBRE
- ENVIROCRETE® 30% 32MPa 30KG STEEL FIBRE
- ENVIROCRETE® 30% 40MPa 30KG STEEL FIBRE
- ENVIROCRETE® 30% 50MPa 30KG STEEL FIBRE

Table no. 47 and 48.....51

- ENVIROCRETE® PLUS 32MPa 20KG STEEL FIBRE
- ENVIROCRETE® PLUS 40MPa 20KG STEEL FIBRE
- ENVIROCRETE® PLUS 50MPa 20KG STEEL FIBRE
- ENVIROCRETE® PLUS 32MPa 25KG STEEL FIBRE
- ENVIROCRETE® PLUS 40MPa 25KG STEEL FIBRE

Table no. 49 and 50..... 52

- ENVIROCRETE® PLUS 50MPa 25KG STEEL FIBRE
- ENVIROCRETE® PLUS 32MPa 30KG STEEL FIBRE
- ENVIROCRETE® PLUS 40MPa 30KG STEEL FIBRE
- ENVIROCRETE® PLUS 50MPa 30KG STEEL FIBRE

Table no. 51 and 52.....53

- ENVISIA® 32MPa 20KG STEEL FIBRE
- ENVISIA® 40MPa 20KG STEEL FIBRE
- ENVISIA® 50MPa 20KG STEEL FIBRE
- ENVISIA® 32MPa 25KG STEEL FIBRE
- ENVISIA® 40MPa 25KG STEEL FIBRE

Table no. 53 and 54.....54

- ENVISIA® 50MPa 25KG STEEL FIBRE
- ENVISIA® 32MPa 30KG STEEL FIBRE
- ENVISIA® 40MPa 30KG STEEL FIBRE
- ENVISIA® 50MPa 30KG STEEL FIBRE

Cradle-to-gate GWP-GHG summary (kg CO₂ eq / m³)

Sydney region

NORMAL CLASS GP BLEND 20 MPa	NORMAL CLASS GP BLEND 25 MPa	NORMAL CLASS GP BLEND 32 MPa	NORMAL CLASS GP BLEND 40 MPa	NORMAL CLASS GP BLEND 50 MPa		
261	278	304	346	441		
NORMAL CLASS GP / FA BLEND 20 MPa	NORMAL CLASS GP / FA BLEND 25 MPa	NORMAL CLASS GP / FA BLEND 32 MPa	NORMAL CLASS GP / FA BLEND 40 MPa	NORMAL CLASS GP / FA BLEND 50 MPa		
200	221	250	322	409		
NORMAL CLASS GP / GGBFS BLEND 20 MPa	NORMAL CLASS GP / GGBFS BLEND 25 MPa	NORMAL CLASS GP / GGBFS BLEND 32 MPa	NORMAL CLASS GP / GGBFS BLEND 40 MPa	NORMAL CLASS GP / GGBFS BLEND 50 MPa		
183	194	211	239	304		
NORMAL CLASS GP / GGBFS / FA BLEND 20 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 25 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 32 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 40 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 50 MPa		
151	166	198	236	367		
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa		
200	221	250	301	381		
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa		
183	199	228	272	337		
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	ENVIROCRETE® PLUS 65 MPa	ENVIROCRETE® PLUS 80 MPa
186	201	217	255	311	347	373
ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa	ENVISIA® 80 MPa
166	174	182	227	296	334	363
POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa	
331	324	315	317	367	373	
TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	SHOTCRETE 40MPa 10MM	SHOTCRETE 40MPa 35KG STEEL FIBRE	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
248	324	367	299	355	243	277
NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 4:1	STABILISED SAND 8:1	THERMAL FTB 45	THERMAL FTB 60	
240	54	163	87	62	73	
TfNSW B80 40MPa PUMP B1 EXPOSURE	TfNSW B80 40 MPa PUMP B2 EXPOSURE	TfNSW B80 40 MPa TREMIE B2 EXPOSURE	TfNSW B80 50 MPa TREMIE CFA C1 EXPOSURE			
303	221	225	237			
TfNSW B80 50MPa 20MM PUMP B2 EXPOSURE	TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE	TfNSW R82 5MPa 20MM HAND PLACE	TfNSW R83 35MPa 20MM HAND/MACHINE PLACE			
229	223	108	279			
TFNSW LCC B80 40MPa B1	TFNSW LCC B80 40MPa B2	TFNSW LCC B80 50MPa B1	TFNSW LCC B80 50MPa B2	TFNSW LCC B80 60MPa B2/C1	TFNSW LCC B80 65MPa B2/C1	
273	204	251	216	230	239	

Cradle-to-gate GWP-GHG summary (kg CO₂ eq / m³)

Sydney region

LOW HEAT S65 SWC	LOW HEAT S80 SWC	LOW HEAT S100@90D SWC	SPECIAL 65MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65MPa PRECAST TUNNEL SEGMENTS (30% SCM)	ENVISIA 50MPa PRECAST TUNNEL SEGMENTS		
252	274	315	284	266	259		
ASPIRE 40GPa 65MPa	ASPIRE 40GPa 65MPa High Early	ASPIRE 42GPa 50MPa	ASPIRE 45GPa/80MPa	ASPIRE 45GPa/80MPa High Early	ASPIRE 45GPa/80MPa LOW HEAT	ASPIRE 45GPa/80MPa LATE AGE / LOW HEAT	
358	405	367	372	438	373	380	
ASPIRE 46GPa 65MPa	ASPIRE 47GPa/80MPa	ASPIRE 50GPa/100MPa	ASPIRE 50GPa/100MPa HIGH EARLY	ASPIRE 50GPa/100MPa LOW HEAT	ASPIRE 50GPa/100MPa LATE AGE/LOW HEAT	HIGH STRENGTH 100MPa @ 90 DAYS	HIGH STRENGTH 120MPa @ 90 DAYS
372	376	375	445	376	395	419	440
BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND				
245	276	309	351				
BLOCKFILL 20MPa GP/ GGBFS/FA BLEND	BLOCKFILL 25MPa GP/ GGBFS/FA BLEND	BLOCKFILL 32MPa GP/ GGBFS/FA BLEND	BLOCKFILL 40MPa GP/ GGBFS/FA BLEND				
186	192	225	257				
FIBRE 32MPa 20KG STEEL	FIBRE 40MPa 20KG STEEL	FIBRE 50MPa 20KG STEEL	FIBRE 32MPa 25KG STEEL				
331	353	423	339				
FIBRE 40MPa 25KG STEEL	FIBRE 50MPa 25KG STEEL	FIBRE 32MPa 30KG STEEL	FIBRE 40MPa 30KG STEEL	FIBRE 50MPa 30KG STEEL			
361	431	347	369	439			
ENVIROCRETE 30% 32MPa 20KG STEEL FIBRE	ENVIROCRETE 30% 40MPa 20KG STEEL FIBRE	ENVIROCRETE 30% 50MPa 20KG STEEL FIBRE	ENVIROCRETE 30% 32MPa 25KG STEEL FIBRE	ENVIROCRETE 30% 40MPa 25KG STEEL FIBRE			
283	334	414	291	342			
ENVIROCRETE 30% 50MPa 25KG STEEL FIBRE	ENVIROCRETE 30% 32MPa 30KG STEEL FIBRE	ENVIROCRETE 30% 40MPa 30KG STEEL FIBRE	ENVIROCRETE 30% 50MPa 30KG STEEL FIBRE				
422	299	350	430				
ENVIROCRETE PLUS 32MPa 20KG STEEL FIBRE	ENVIROCRETE PLUS 40MPa 20KG STEEL FIBRE	ENVIROCRETE PLUS 50MPa 20KG STEEL FIBRE	ENVIROCRETE PLUS 32MPa 25KG STEEL FIBRE	ENVIROCRETE PLUS 40MPa 25KG STEEL FIBRE			
249	301	343	257	309			
ENVIROCRETE PLUS 50MPa 25KG STEEL FIBRE	ENVIROCRETE PLUS 32MPa 30KG STEEL FIBRE	ENVIROCRETE PLUS 40MPa 30KG STEEL FIBRE	ENVIROCRETE PLUS 50MPa 30KG STEEL FIBRE				
351	265	317	360				
ENVISIA 32MPa 20KG STEEL FIBRE	ENVISIA 40MPa 20KG STEEL FIBRE	ENVISIA 50MPa 20KG STEEL FIBRE	ENVISIA 32MPa 25KG STEEL FIBRE	ENVISIA 40MPa 25KG STEEL FIBRE			
225	283	336	233	291			
ENVISIA 50MPa 25KG STEEL FIBRE	ENVISIA 32MPa 30KG STEEL FIBRE	ENVISIA 40MPa 30KG STEEL FIBRE	ENVISIA 50MPa 30KG STEEL FIBRE				
344	242	299	352				

Sydney region

TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	NORMAL GP BLEND 20MPa	NORMAL GP BLEND 25MPa	NORMAL GP BLEND 32MPa	NORMAL GP BLEND 40MPa	NORMAL GP BLEND 50MPa
GWP	kg CO₂ eq	261	278	304	346	441
ODP	kg CFC-11 eq	1.94E-06	1.97E-06	2.01E-06	2.10E-06	2.33E-06
AP	kg SO ₂ eq	0.386	0.405	0.434	0.483	0.601
EP	kg PO ₄ --- eq	0.0931	0.0979	0.105	0.117	0.145
POCP	kg C ₂ H ₄ eq	0.0179	0.0188	0.0201	0.0223	0.0279
ADPE	kg Sb eq	2.36E-06	2.51E-06	2.80E-06	3.19E-06	8.04E-06
ADPF	MJ	1530	1620	1750	1980	2500

TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	NORMAL GP BLEND 20MPa	NORMAL GP BLEND 25MPa	NORMAL GP BLEND 32MPa	NORMAL GP BLEND 40MPa	NORMAL GP BLEND 50MPa
PERE	MJ _{NCV}	9.97E+01	5.38E+01	5.76E+01	5.60E+01	6.85E+01
PERM	MJ _{NCV}	6.73E-02	0.00E+00	0.00E+00	0.00E+00	3.37E-02
PERT	MJ _{NCV}	9.98E+01	5.38E+01	5.76E+01	5.60E+01	6.85E+01
PENRE	MJ _{NCV}	2.43E+03	1.27E+03	1.34E+03	1.34E+03	1.62E+03
PENRM	MJ _{NCV}	1.81E+01	7.82E+00	9.03E+00	5.26E+00	8.96E+00
PENRT	MJ _{NCV}	2.45E+03	1.27E+03	1.35E+03	1.34E+03	1.63E+03
SM	kg	2.70E+02	1.92E+02	2.07E+02	2.03E+02	2.39E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.03E+00	3.37E+00	3.34E+00	3.27E+00	3.21E+00
HW	kg	3.38E-05	8.39E-06	1.37E-05	6.70E-06	1.69E-05
NHW	kg	2.93E+00	4.44E-01	1.67E+00	7.72E-01	1.68E+00
RW	kg	5.09E-03	1.46E-03	2.62E-03	1.23E-03	2.56E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 3. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	NORMAL GP / FA BLEND 20MPa	NORMAL GP / FA BLEND 25MPa	NORMAL GP / FA BLEND 32MPa	NORMAL GP / FA BLEND 40MPa	NORMAL GP / FA BLEND 50MPa
GWP	kg CO₂ eq	200	221	250	322	409
ODP	kg CFC-11 eq	1.99E-06	2.01E-06	2.07E-06	2.24E-06	2.44E-06
AP	kg SO ₂ eq	0.319	0.343	0.376	0.461	0.568
EP	kg PO ₄ --- eq	0.0762	0.0821	0.0905	0.111	0.137
POCP	kg C ₂ H ₄ eq	0.0151	0.0162	0.0177	0.0215	0.0266
ADPE	kg Sb eq	2.22E-06	2.38E-06	2.68E-06	3.13E-06	7.97E-06
ADPF	MJ	1230	1340	1490	1870	2350

TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	NORMAL GP / FA BLEND 20MPa	NORMAL GP / FA BLEND 25MPa	NORMAL GP / FA BLEND 32MPa	NORMAL GP / FA BLEND 40MPa	NORMAL GP / FA BLEND 50MPa
PERE	MJ _{NCV}	8.24E+01	1.05E+02	1.14E+02	7.34E+01	7.28E+01
PERM	MJ _{NCV}	4.33E-02	1.86E-01	1.97E-01	0.00E+00	0.00E+00
PERT	MJ _{NCV}	8.24E+01	1.05E+02	1.14E+02	7.34E+01	7.28E+01
PENRE	MJ _{NCV}	1.99E+03	2.38E+03	2.56E+03	1.92E+03	1.90E+03
PENRM	MJ _{NCV}	1.10E+01	4.47E+01	5.42E+01	8.41E+00	1.28E+01
PENRT	MJ _{NCV}	2.01E+03	2.42E+03	2.62E+03	1.93E+03	1.91E+03
SM	kg	2.52E+02	2.92E+02	2.93E+02	5.32E+01	5.29E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.12E+00	3.13E+00	3.15E+00	3.13E+00	3.13E+00
HW	kg	2.10E-05	7.92E-05	9.33E-05	1.38E-05	1.95E-05
NHW	kg	2.02E+00	4.38E+00	5.28E+00	1.89E+00	2.19E+00
RW	kg	3.15E-03	1.11E-02	1.35E-02	2.70E-03	3.74E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	NORMAL GP/ GGBFS BLEND 20MPa	NORMAL GP/ GGBFS BLEND 25MPa	NORMAL GP/ GGBFS BLEND 32MPa	NORMAL GP/ GGBFS BLEND 40MPa	NORMAL GP/ GGBFS BLEND 50MPa
GWP	kg CO₂ eq	183	194	211	239	304
ODP	kg CFC-11 eq	2.00E-06	2.03E-06	2.08E-06	2.18E-06	2.43E-06
AP	kg SO ₂ eq	0.306	0.320	0.340	0.375	0.461
EP	kg PO ₄ --- eq	0.0721	0.0754	0.0803	0.0888	0.109
POCP	kg C ₂ H ₄ eq	0.0152	0.0159	0.0169	0.0186	0.0231
ADPE	kg Sb eq	2.27E-06	2.41E-06	2.69E-06	3.06E-06	7.87E-06
ADPF	MJ	1230	1300	1400	1560	1970

TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	NORMAL GP/ GGBFS BLEND 20MPa	NORMAL GP/ GGBFS BLEND 25MPa	NORMAL GP/ GGBFS BLEND 32MPa	NORMAL GP/ GGBFS BLEND 40MPa	NORMAL GP/ GGBFS BLEND 50MPa
PERE	MJ _{NCV}	7.03E+01	7.51E+01	8.92E+01	9.41E+01	7.00E+01
PERM	MJ _{NCV}	0.00E+00	3.85E-02	5.58E-02	9.76E-02	9.62E-02
PERT	MJ _{NCV}	7.03E+01	7.51E+01	8.92E+01	9.42E+01	7.01E+01
PENRE	MJ _{NCV}	1.84E+03	1.92E+03	2.25E+03	2.33E+03	1.65E+03
PENRM	MJ _{NCV}	8.21E+00	7.66E+00	2.27E+01	3.26E+01	1.26E+01
PENRT	MJ _{NCV}	1.84E+03	1.93E+03	2.27E+03	2.36E+03	1.66E+03
SM	kg	5.15E+01	1.84E+02	2.16E+02	2.15E+02	2.14E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.16E+00	2.97E+00	2.87E+00	3.09E+00	3.08E+00
HW	kg	1.35E-05	1.96E-05	3.91E-05	5.21E-05	4.26E-05
NHW	kg	1.84E+00	2.70E+00	3.31E+00	2.76E+00	6.18E+00
RW	kg	2.63E-03	3.16E-03	6.33E-03	7.72E-03	6.82E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	NORMAL GP / GGBFS / FA BLEND 20MPa	NORMAL GP / GGBFS / FA BLEND 25MPa	NORMAL GP / GGBFS / FA BLEND 32MPa	NORMAL GP/ GGBFS / FA BLEND 40MPa	NORMAL GP / GGBFS / FA BLEND 50MPa
GWP	kg CO₂ eq	151	166	198	236	367
ODP	kg CFC-11 eq	2.03E-06	2.07E-06	2.17E-06	2.29E-06	2.42E-06
AP	kg SO ₂ eq	0.269	0.288	0.326	0.372	0.523
EP	kg PO ₄ ---eq	0.0631	0.0677	0.0769	0.0882	0.125
POCP	kg C ₂ H ₄ eq	0.0134	0.0142	0.0161	0.0183	0.0249
ADPE	kg Sb eq	2.16E-06	2.30E-06	2.62E-06	3.01E-06	7.90E-06
ADPF	MJ	1040	1120	1300	1520	2170

TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	NORMAL GP / GGBFS / FA BLEND 20MPa	NORMAL GP / GGBFS / FA BLEND 25MPa	NORMAL GP / GGBFS / FA BLEND 32MPa	NORMAL GP/ GGBFS / FA BLEND 40MPa	NORMAL GP / GGBFS / FA BLEND 50MPa
PERE	MJ _{NCV}	8.37E+01	9.19E+01	6.95E+01	1.17E+02	5.29E+01
PERM	MJ _{NCV}	1.11E-01	1.01E-01	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	8.38E+01	9.20E+01	6.95E+01	1.17E+02	5.29E+01
PENRE	MJ _{NCV}	2.03E+03	2.26E+03	1.80E+03	2.57E+03	1.42E+03
PENRM	MJ _{NCV}	1.39E+01	1.40E+01	1.97E+01	1.97E+01	0.00E+00
PENRT	MJ _{NCV}	2.05E+03	2.28E+03	1.82E+03	2.58E+03	1.42E+03
SM	kg	2.04E+02	2.16E+02	1.51E+02	1.82E+02	1.02E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	1.18E+01	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	5.50E+00	0.00E+00
FW	m ³	3.00E+00	2.90E+00	3.01E+00	3.87E+00	3.10E+00
HW	kg	4.42E-05	4.49E-05	2.71E-05	2.86E-02	9.03E-07
NHW	kg	5.86E+00	6.35E+00	2.27E+00	2.33E+01	5.78E-01
RW	kg	6.76E-03	7.13E-03	5.08E-03	6.99E-03	2.11E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 9. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
GWP	kg CO₂ eq	200	221	250	301	381
ODP	kg CFC-11 eq	1.99E-06	2.01E-06	2.07E-06	2.25E-06	2.46E-06
AP	kg SO ₂ eq	0.319	0.343	0.376	0.439	0.540
EP	kg PO ₄ --- eq	0.0762	0.0821	0.0905	0.106	0.130
POCP	kg C ₂ H ₄ eq	0.0151	0.0162	0.0177	0.0207	0.0256
ADPE	kg Sb eq	2.22E-06	2.38E-06	2.68E-06	3.11E-06	7.93E-06
ADPF	MJ	1230	1340	1490	1790	2240

TABLE 10. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
PERE	MJ _{NCV}	5.86E+01	6.18E+01	6.65E+01	7.44E+01	9.41E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.86E+01	6.18E+01	6.65E+01	7.44E+01	9.41E+01
PENRE	MJ _{NCV}	1.53E+03	1.62E+03	1.75E+03	1.97E+03	2.49E+03
PENRM	MJ _{NCV}	6.23E+00	6.72E+00	7.76E+00	9.07E+00	1.51E+01
PENRT	MJ _{NCV}	1.54E+03	1.63E+03	1.76E+03	1.98E+03	2.51E+03
SM	kg	9.04E+00	9.69E+00	1.07E+01	1.23E+01	1.58E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.20E+00	3.18E+00	3.11E+00	3.05E+00	3.00E+00
HW	kg	6.68E-06	7.21E-06	8.32E-06	9.73E-06	1.93E-05
NHW	kg	3.65E-01	3.83E-01	4.12E-01	4.59E-01	1.51E+00
RW	kg	1.16E-03	1.25E-03	1.45E-03	1.69E-03	3.54E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 11. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
GWP	kg CO ₂ eq	183	199	228	272	337
ODP	kg CFC-11 eq	1.99E-06	2.03E-06	2.12E-06	2.25E-06	2.42E-06
AP	kg SO ₂ eq	0.305	0.324	0.360	0.413	0.492
EP	kg PO ₄ --- eq	0.0715	0.0763	0.0851	0.0979	0.117
POCP	kg C ₂ H ₄ eq	0.0148	0.0157	0.0174	0.0199	0.0238
ADPE	kg Sb eq	4.15E-06	4.41E-06	4.93E-06	5.81E-06	8.23E-06
ADPF	MJ	1180	1270	1430	1670	2060

TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
PERE	MJ _{NCV}	4.72E+01	5.11E+01	5.66E+01	6.98E+01	8.80E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.72E+01	5.11E+01	5.66E+01	6.98E+01	8.80E+01
PENRE	MJ _{NCV}	1.23E+03	1.34E+03	1.49E+03	1.86E+03	2.34E+03
PENRM	MJ _{NCV}	6.23E+00	6.72E+00	7.76E+00	9.07E+00	1.51E+01
PENRT	MJ _{NCV}	1.24E+03	1.34E+03	1.50E+03	1.87E+03	2.36E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	9.45E+01	9.77E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.18E+00	3.15E+00	3.09E+00	3.05E+00	2.99E+00
HW	kg	6.68E-06	7.21E-06	8.32E-06	9.73E-06	1.93E-05
NHW	kg	3.03E-01	3.25E-01	3.59E-01	4.35E-01	1.47E+00
RW	kg	1.16E-03	1.25E-03	1.45E-03	1.69E-03	3.54E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 13. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	ENVIROCRETE® PLUS 65 MPa	ENVIROCRETE® PLUS 80 MPa
GWP	kg CO₂ eq.	186	201	217	255	311	347	373
ODP	kg CFC11 eq	2.05E-06	2.09E-06	2.16E-06	2.26E-06	2.50E-06	2.61E-06	2.69E-06
AP	kg SO ₂ eq	0.327	0.346	0.365	0.413	0.49	0.548	0.578
EP	kg PO ₄ ³⁻ eq	0.0736	0.0783	0.0827	0.0935	0.111	0.124	0.13
POCP	kg C ₂ H ₄ eq	0.0162	0.0171	0.018	0.0201	0.0241	0.0278	0.0288
ADPE	kg Sb eq	4.27E-06	4.53E-06	3.86E-06	5.09E-06	7.05E-06	1.59E-05	1.39E-05
ADPF	MJ _{NCV}	1290	1380	1460	1660	2020	2340	2440

TABLE 14. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	ENVIROCRETE® PLUS 65 MPa	ENVIROCRETE® PLUS 80 MPa
PERE	MJ _{NCV}	5.00E+01	5.24E+01	5.63E+01	6.26E+01	7.89E+01	4.13E+01	4.44E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.00E+01	5.24E+01	5.63E+01	6.26E+01	7.89E+01	4.13E+01	4.44E+01
PENRE	MJ _{NCV}	1.23E+03	1.29E+03	1.39E+03	1.56E+03	1.96E+03	1.03E+03	1.12E+03
PENRM	MJ _{NCV}	6.23E+00	6.72E+00	7.76E+00	9.07E+00	1.51E+01	6.23E+00	6.72E+00
PENRT	MJ _{NCV}	1.24E+03	1.30E+03	1.40E+03	1.57E+03	1.98E+03	1.04E+03	1.13E+03
SM	kg	1.17E+02	1.26E+02	1.38E+02	1.59E+02	2.05E+02	1.67E+02	1.75E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.20E+00	3.18E+00	3.11E+00	3.05E+00	3.01E+00	3.17E+00	3.15E+00
HWD	kg	6.68E-06	7.21E-06	8.32E-06	9.73E-06	1.93E-05	6.68E-06	7.21E-06
NHWD	kg	3.83E-01	4.03E-01	4.34E-01	4.84E-01	1.54E+00	3.05E-01	3.28E-01
RWD	kg	1.16E-03	1.25E-03	1.45E-03	1.69E-03	3.54E-03	1.16E-03	1.25E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00

Sydney region

TABLE 15. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa	ENVISIA® 80 MPa
GWP	kg CO ₂ eq.	166	174	182	227	296	334	363
ODP	kg CFC11 eq	2.10E-06	2.13E-06	2.17E-06	2.33E-06	2.49E-06	2.61E-06	2.67E-06
AP	kg SO ₂ eq	0.328	0.346	0.337	0.4	0.483	0.553	0.592
EP	kg PO ₄ ³⁻ eq	0.0694	0.0719	0.0737	0.0873	0.107	0.122	0.132
POCP	kg C ₂ H ₄ eq	0.0164	0.0175	0.017	0.0203	0.0241	0.0291	0.0313
ADPE	kg Sb eq	2.75E-06	7.28E-06	3.30E-06	7.47E-06	9.12E-06	2.58E-05	3.10E-05
ADPF	MJ _{NCV}	1270	1340	1340	1630	2000	2400	2590

TABLE 16. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa	ENVISIA® 80 MPa
PERE	MJ _{NCV}	5.11E+01	5.91E+01	8.25E+01	4.72E+01	5.11E+01	5.66E+01	6.75E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.11E+01	5.91E+01	8.25E+01	4.72E+01	5.11E+01	5.66E+01	6.75E+01
PENRE	MJ _{NCV}	1.30E+03	1.51E+03	2.16E+03	1.23E+03	1.34E+03	1.49E+03	1.78E+03
PENRM	MJ _{NCV}	7.76E+00	9.07E+00	1.51E+01	6.23E+00	6.72E+00	7.76E+00	9.07E+00
PENRT	MJ _{NCV}	1.31E+03	1.52E+03	2.18E+03	1.24E+03	1.34E+03	1.50E+03	1.79E+03
SM	kg	1.91E+02	2.10E+02	1.34E+02	1.00E+02	9.06E+01	9.18E+01	1.23E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.09E+00	3.04E+00	2.99E+00	3.18E+00	3.15E+00	3.09E+00	3.05E+00
HWD	kg	8.32E-06	9.73E-06	1.93E-05	6.68E-06	7.21E-06	8.32E-06	9.73E-06
NHWD	kg	3.76E-01	4.34E-01	1.47E+00	3.03E-01	3.25E-01	3.59E-01	4.40E-01
RWD	kg	1.45E-03	1.69E-03	3.54E-03	1.16E-03	1.25E-03	1.45E-03	1.69E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00

Sydney region

TABLE 17. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
GWP	kg CO₂ eq.	331	324	315	317	367	373
ODP	kg CFC11 eq	2.20E-06	2.15E-06	2.17E-06	2.37E-06	2.52E-06	2.60E-06
AP	kg SO ₂ eq	0.479	0.471	0.459	0.473	0.537	0.547
EP	kg PO ₄ ³⁻ eq	0.114	0.112	0.109	0.111	0.127	0.130
POCP	kg C ₂ H ₄ eq	0.0224	0.0222	0.0215	0.0228	0.0265	0.0274
ADPE	kg Sb eq	8.15E-06	1.01E-05	7.94E-06	1.10E-05	1.64E-05	1.69E-05
ADPF	MJ _{NCV}	1930	1900	1840	1930	2260	2350

TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
PERE	MJ _{NCV}	7.34E+01	7.28E+01	7.03E+01	7.51E+01	8.92E+01	9.41E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	5.58E-02	9.76E-02
PERT	MJ _{NCV}	7.34E+01	7.28E+01	7.03E+01	7.51E+01	8.92E+01	9.42E+01
PENRE	MJ _{NCV}	1.92E+03	1.90E+03	1.84E+03	1.92E+03	2.25E+03	2.33E+03
PENRM	MJ _{NCV}	8.41E+00	1.28E+01	8.21E+00	7.66E+00	2.27E+01	3.26E+01
PENRT	MJ _{NCV}	1.93E+03	1.91E+03	1.84E+03	1.93E+03	2.27E+03	2.36E+03
SM	kg	5.32E+01	5.29E+01	5.15E+01	1.84E+02	2.16E+02	2.15E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.13E+00	3.13E+00	3.16E+00	2.97E+00	2.87E+00	3.09E+00
HWD	kg	1.38E-05	1.95E-05	1.35E-05	1.96E-05	3.91E-05	5.21E-05
NHWD	kg	1.89E+00	2.19E+00	1.84E+00	2.70E+00	3.31E+00	2.76E+00
RWD	kg	2.70E-03	3.74E-03	2.63E-03	3.16E-03	6.33E-03	7.72E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Sydney region

TABLE 19. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	SHOTCRETE 40MPa 10MM	SHOTCRETE 40MPa 35KG STEEL FIBRE	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
GWP	kg CO ₂ eq.	248	324	367	299	355	243	277
ODP	kg CFC11 eq	2.30E-06	2.44E-06	2.55E-06	2.26E-06	5.65E-06	2.07E-06	2.12E-06
AP	kg SO ₂ eq	0.416	0.501	0.554	0.446	0.797	0.368	0.409
EP	kg PO ₄ ³⁻ eq	0.0922	0.114	0.126	0.106	0.189	0.0875	0.0974
POCP	kg C ₂ H ₄ eq	0.0212	0.0249	0.0274	0.0215	0.0420	0.0170	0.0192
ADPE	kg Sb eq	2.50E-05	2.42E-05	2.58E-05	1.19E-05	6.71E-02	1.82E-06	2.38E-06
ADPF	MJ _{NCV}	1660	2040	2270	1810	2490	1420	1610

TABLE 20. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	SHOTCRETE 40MPa 10MM	SHOTCRETE 40MPa 35KG STEEL FIBRE	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
PERE	MJ _{NCV}	7.00E+01	8.37E+01	9.19E+01	6.95E+01	1.17E+02	5.29E+01	6.04E+01
PERM	MJ _{NCV}	9.62E-02	1.11E-01	1.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	7.01E+01	8.38E+01	9.20E+01	6.95E+01	1.17E+02	5.29E+01	6.04E+01
PENRE	MJ _{NCV}	1.65E+03	2.03E+03	2.26E+03	1.80E+03	2.57E+03	1.42E+03	1.61E+03
PENRM	MJ _{NCV}	1.26E+01	1.39E+01	1.40E+01	1.97E+01	1.97E+01	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.66E+03	2.05E+03	2.28E+03	1.82E+03	2.58E+03	1.42E+03	1.61E+03
SM	kg	2.14E+02	2.04E+02	2.16E+02	1.51E+02	1.82E+02	1.02E+02	8.25E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E+01	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.50E+00	0.00E+00	0.00E+00
FW	m ³	3.08E+00	3.00E+00	2.90E+00	3.01E+00	3.87E+00	3.10E+00	3.09E+00
HWD	kg	4.26E-05	4.42E-05	4.49E-05	2.71E-05	2.86E-02	9.03E-07	4.07E-06
NHWD	kg	6.18E+00	5.86E+00	6.35E+00	2.27E+00	2.33E+01	5.78E-01	6.40E-01
RWD	kg	6.82E-03	6.76E-03	7.13E-03	5.08E-03	6.99E-03	2.11E-04	6.83E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00

Sydney region

TABLE 21. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 4:1	STABILISED SAND 8:1	THERMAL FTB 45	THERMAL FTB 60
GWP	kg CO ₂ eq.	240	54	163	87	62	73
ODP	kg CFC11 eq	1.74E-06	1.06E-06	1.75E-06	1.27E-06	1.69E-06	1.63E-06
AP	kg SO ₂ eq	0.351	0.118	0.268	0.163	0.157	0.165
EP	kg PO ₄ ³⁻ eq	0.0843	0.0267	0.0615	0.0372	0.0356	0.0379
POCP	kg C ₂ H ₄ eq	0.0161	0.00563	0.0134	0.00796	0.00759	0.00794
ADPE	kg Sb eq	8.89E-07	1.59E-07	5.18E-07	2.67E-07	4.29E-07	4.40E-07
ADPF	MJ _{NCV}	1390	421	1130	633	495	544

TABLE 22. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 4:1	STABILISED SAND 8:1	THERMAL FTB 45	THERMAL FTB 60
PERE	MJ _{NCV}	5.30E+01	1.62E+01	4.36E+01	2.44E+01	1.95E+01	2.13E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.30E+01	1.62E+01	4.36E+01	2.44E+01	1.95E+01	2.13E+01
PENRE	MJ _{NCV}	1.39E+03	4.21E+02	1.13E+03	6.33E+02	4.95E+02	5.44E+02
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.39E+03	4.21E+02	1.13E+03	6.33E+02	4.95E+02	5.44E+02
SM	kg	8.40E+00	6.32E+01	2.20E+02	1.10E+02	1.26E+02	1.11E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.66E+00	2.47E+00	2.54E+00	2.49E+00	3.30E+00	3.15E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	3.12E-01	1.30E-01	3.68E-01	2.01E-01	1.26E-01	1.36E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Sydney region

TABLE 23. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	TfNSW B80 40 MPa PUMP B1 EXPOSURE	TfNSW B80 40 MPa PUMP B2 EXPOSURE	TfNSW B80 40 MPa TREMIE B2 EXPOSURE	TfNSW B80 50 MPa TREMIE CFA C1 EXPOSURE
GWP	kg CO ₂ eq.	303	221	225	237
ODP	kg CFC11 eq	2.27E-06	2.37E-06	2.37E-06	2.43E-06
AP	kg SO ₂ eq	0.449	0.365	0.380	0.402
EP	kg PO ₄ ³⁻ eq	0.107	0.0849	0.0870	0.0912
POCP	kg C ₂ H ₄ eq	0.0212	0.0185	0.0197	0.0212
ADPE	kg Sb eq	8.20E-06	6.37E-06	1.50E-05	2.18E-05
ADPF	MJ _{NCV}	1800	1500	1560	1670

TABLE 24. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	TfNSW B80 40 MPa PUMP B1 EXPOSURE	TfNSW B80 40 MPa PUMP B2 EXPOSURE	TfNSW B80 40 MPa TREMIE B2 EXPOSURE	TfNSW B80 50 MPa TREMIE CFA C1 EXPOSURE
PERE	MJ _{NCV}	6.78E+01	5.95E+01	6.56E+01	7.33E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	8.46E-02	2.02E-01
PERT	MJ _{NCV}	6.78E+01	5.95E+01	6.57E+01	7.35E+01
PENRE	MJ _{NCV}	1.79E+03	1.49E+03	1.55E+03	1.66E+03
PENRM	MJ _{NCV}	1.11E+01	1.10E+01	1.81E+01	2.28E+01
PENRT	MJ _{NCV}	1.80E+03	1.50E+03	1.57E+03	1.68E+03
SM	kg	1.25E+02	2.66E+02	2.51E+02	2.77E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.15E+00	3.05E+00	3.16E+00	3.13E+00
HWD	kg	1.63E-05	1.45E-05	3.69E-05	5.86E-05
NHWD	kg	1.74E+00	1.29E+00	3.08E+00	4.39E+00
RWD	kg	3.10E-03	2.70E-03	5.40E-03	7.31E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Sydney region

TABLE 25. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	TfNSW B80 50MPa 20MM PUMP B2 EXPOSURE	TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE	TfNSW R82 5MPa 20MM HAND PLACE	TfNSW R83 35MPa 20MM HAND/ MACHINE PLACE
GWP	kg CO ₂ eq.	229	223	108	279
ODP	kg CFC11 eq	2.42E-06	2.38E-06	1.98E-06	2.22E-06
AP	kg SO ₂ eq	0.377	0.373	0.220	0.416
EP	kg PO ₄ ³⁻ eq	0.0875	0.0863	0.0507	0.0989
POCP	kg C ₂ H ₄ eq	0.0191	0.0192	0.0108	0.0194
ADPE	kg Sb eq	8.76E-06	1.27E-05	1.77E-06	4.03E-06
ADPF	MJ _{NCV}	1540	1540	767	1630

TABLE 26. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	TfNSW B80 50MPa 20MM PUMP B2 EXPOSURE	TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE	TfNSW R82 5MPa 20MM HAND PLACE	TfNSW R83 35MPa 20MM HAND/ MACHINE PLACE
PERE	MJ _{NCV}	6.12E+01	9.19E+01	6.95E+01	1.62E+01
PERM	MJ _{NCV}	0.00E+00	1.01E-01	0.00E+00	0.00E+00
PERT	MJ _{NCV}	6.12E+01	9.20E+01	6.95E+01	1.62E+01
PENRE	MJ _{NCV}	1.54E+03	2.26E+03	1.80E+03	4.21E+02
PENRM	MJ _{NCV}	1.37E+01	1.40E+01	1.97E+01	0.00E+00
PENRT	MJ _{NCV}	1.55E+03	2.28E+03	1.82E+03	4.21E+02
SM	kg	2.88E+02	2.16E+02	1.51E+02	6.32E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.98E+00	2.90E+00	3.01E+00	2.47E+00
HWD	kg	1.92E-05	4.49E-05	2.71E-05	0.00E+00
NHWD	kg	1.80E+00	6.35E+00	2.27E+00	1.30E-01
RWD	kg	3.60E-03	7.13E-03	5.08E-03	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Sydney region

TABLE 27. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	TFNSW LCC B80 40MPa B1	TFNSW LCC B80 40MPa B2	TFNSW LCC B80 50MPa B1	TFNSW LCC B80 50MPa B2	TFNSW LCC B80 60MPa B2/C1	TFNSW LCC B80 65MPa B2/C1
GWP	kg CO ₂ eq.	273	204	251	216	230	239
ODP	kg CFC11 eq	2.24E-06	2.30E-06	2.35E-06	2.37E-06	2.42E-06	2.45E-06
AP	kg SO ₂ eq	0.412	0.344	0.399	0.364	0.382	0.396
EP	kg PO ₄ ³⁻ eq	0.0980	0.0799	0.0931	0.0837	0.0881	0.0907
POCP	kg C ₂ H ₄ eq	0.0196	0.0176	0.0200	0.0187	0.0196	0.0204
ADPE	kg Sb eq	6.67E-06	7.24E-06	8.49E-06	1.05E-05	1.03E-05	1.30E-05
ADPF	MJ _{NCV}	1640	1400	1650	1490	1580	1640

TABLE 28. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	TFNSW LCC B80 40MPa B1	TFNSW LCC B80 40MPa B2	TFNSW LCC B80 50MPa B1	TFNSW LCC B80 50MPa B2	TFNSW LCC B80 60MPa B2/C1	TFNSW LCC B80 65MPa B2/C1
PERE	MJ _{NCV}	6.23E+01	5.75E+01	6.66E+01	6.17E+01	6.51E+01	6.74E+01
PERM	MJ _{NCV}	1.92E-02	4.09E-02	4.33E-02	5.05E-02	5.29E-02	5.29E-02
PERT	MJ _{NCV}	6.24E+01	5.75E+01	6.66E+01	6.17E+01	6.51E+01	6.75E+01
PENRE	MJ _{NCV}	1.63E+03	1.40E+03	1.64E+03	1.49E+03	1.58E+03	1.63E+03
PENRM	MJ _{NCV}	9.35E+00	1.10E+01	1.14E+01	1.25E+01	1.34E+01	1.38E+01
PENRT	MJ _{NCV}	1.64E+03	1.41E+03	1.65E+03	1.50E+03	1.59E+03	1.65E+03
SM	kg	1.45E+02	2.45E+02	2.20E+02	2.65E+02	2.81E+02	2.91E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.08E+00	3.09E+00	3.07E+00	3.08E+00	3.03E+00	3.00E+00
HWD	kg	1.53E-05	1.93E-05	2.10E-05	2.46E-05	2.54E-05	2.82E-05
NHWD	kg	1.35E+00	1.41E+00	1.76E+00	2.23E+00	2.14E+00	2.88E+00
RWD	kg	2.50E-03	2.82E-03	3.12E-03	3.71E-03	3.79E-03	4.42E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Sydney region

TABLE 29. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	LOW HEAT S65 SWC	LOW HEAT S80 SWC	LOW HEAT S100@90D SWC	SPECIAL65MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65MPa PRECAST TUNNEL SEGMENTS (30%SCM)	ENVISIA 50MPa PRECAST TUNNEL SEGMENTS
GWP	kg CO ₂ eq.	252	274	315	284	266	259
ODP	kg CFC11 eq	2.46E-06	2.57E-06	2.65E-06	2.28E-06	2.29E-06	2.49E-06
AP	kg SO ₂ eq	0.410	0.442	0.497	0.442	0.424	0.441
EP	kg PO ₄ ³⁻ eq	0.0941	0.101	0.114	0.105	0.0998	0.0992
POCP	kg C ₂ H ₄ eq	0.0209	0.0226	0.0257	0.0228	0.0222	0.0231
ADPE	kg Sb eq	1.30E-05	1.63E-05	2.22E-05	1.76E-05	1.76E-05	1.71E-05
ADPF	MJ _{NCV}	1690	1830	2110	1910	1840	1880

TABLE 30. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	LOW HEAT S65 SWC	LOW HEAT S80 SWC	LOW HEAT S100@90D SWC	SPECIAL65MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65MPa PRECAST TUNNEL SEGMENTS (30%SCM)	ENVISIA 50MPa PRECAST TUNNEL SEGMENTS
PERE	MJ _{NCV}	7.07E+01	7.65E+01	9.01E+01	8.20E+01	8.01E+01	8.25E+01
PERM	MJ _{NCV}	1.38E-01	1.54E-01	2.16E-01	1.92E-01	1.92E-01	1.92E-01
PERT	MJ _{NCV}	7.08E+01	7.66E+01	9.03E+01	8.22E+01	8.03E+01	8.27E+01
PENRE	MJ _{NCV}	1.68E+03	1.82E+03	2.10E+03	1.89E+03	1.82E+03	1.86E+03
PENRM	MJ _{NCV}	1.03E+01	1.14E+01	2.31E+01	3.34E+01	3.34E+01	3.07E+01
PENRT	MJ _{NCV}	1.69E+03	1.83E+03	2.12E+03	1.92E+03	1.86E+03	1.89E+03
SM	kg	2.73E+02	3.18E+02	2.98E+02	1.48E+02	1.73E+02	2.27E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.07E+00	2.98E+00	3.07E+00	3.28E+00	3.28E+00	3.31E+00
HWD	kg	3.34E-05	3.89E-05	6.04E-05	6.28E-05	6.28E-05	5.99E-05
NHWD	kg	2.86E+00	3.69E+00	4.51E+00	2.64E+00	2.65E+00	2.68E+00
RWD	kg	3.78E-03	4.62E-03	7.36E-03	7.84E-03	7.84E-03	7.33E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Sydney region

TABLE 31. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	ASPIRE® 40GPa 65MPa	ASPIRE® 40GPa 65MPa High Early	ASPIRE® 42GPa 50MPa	ASPIRE® 45GPa/ 80MPa	ASPIRE® 45GPa/ 80MPa HIGH EARLY	ASPIRE® 45GPa/ 80MPa LOW HEAT	ASPIRE® 45GPa/80MPa LATE AGE/ LOW HEAT
GWP	kg CO ₂ eq.	358	405	367	372	438	373	380
ODP	kg CFC11 eq	3.49E-06	3.46E-06	3.50E-06	4.22E-06	4.27E-06	4.28E-06	4.13E-06
AP	kg SO ₂ eq	0.585	0.622	0.596	0.600	0.668	0.585	0.587
EP	kg PO ₄ ³⁻ eq	0.129	0.142	0.132	0.136	0.154	0.135	0.136
POCP	kg C ₂ H ₄ eq	0.0305	0.0317	0.0310	0.0325	0.0351	0.0310	0.0306
ADPE	kg Sb eq	2.30E-05	2.31E-05	2.37E-05	2.22E-05	2.16E-05	1.68E-05	1.68E-05
ADPF	MJ _{NCV}	2360	2520	2410	2470	2740	2350	2340

TABLE 32. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	ASPIRE® 40GPa 65MPa	ASPIRE® 40GPa 65MPa High Early	ASPIRE® 42GPa 50MPa	ASPIRE® 45GPa/ 80MPa	ASPIRE® 45GPa/ 80MPa HIGH EARLY	ASPIRE® 45GPa/ 80MPa LOW HEAT	ASPIRE® 45GPa/80MPa LATE AGE/ LOW HEAT
PERE	MJ _{NCV}	9.57E+01	9.98E+01	9.78E+01	9.55E+01	1.03E+02	8.57E+01	8.50E+01
PERM	MJ _{NCV}	2.85E-01	2.85E-01	2.94E-01	2.55E-01	2.55E-01	2.44E-01	2.45E-01
PERT	MJ _{NCV}	9.60E+01	1.00E+02	9.81E+01	9.57E+01	1.03E+02	8.60E+01	8.52E+01
PENRE	MJ _{NCV}	2.35E+03	2.51E+03	2.40E+03	2.46E+03	2.73E+03	2.34E+03	2.33E+03
PENRM	MJ _{NCV}	2.11E+01	2.11E+01	2.18E+01	1.89E+01	1.89E+01	1.81E+01	1.82E+01
PENRT	MJ _{NCV}	2.37E+03	2.54E+03	2.42E+03	2.48E+03	2.75E+03	2.36E+03	2.35E+03
SM	kg	2.22E+02	1.56E+02	2.23E+02	2.64E+02	1.81E+02	2.67E+02	2.37E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.25E+00	3.21E+00	3.24E+00	3.17E+00	3.15E+00	3.04E+00	3.00E+00
HWD	kg	6.59E-05	6.59E-05	6.81E-05	6.04E-05	5.97E-05	5.37E-05	5.39E-05
NHWD	kg	4.61E+00	4.60E+00	4.73E+00	4.63E+00	4.42E+00	3.07E+00	3.05E+00
RWD	kg	7.11E-03	7.11E-03	7.33E-03	6.69E-03	6.52E-03	5.43E-03	5.45E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00

Sydney region

TABLE 33. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	ASPIRE® 46GPa 65MPa	ASPIRE® 47GPa/ 80MPa	ASPIRE® 50GPa/ 100MPa	ASPIRE® 50GPa/ 100MPa High Early	ASPIRE® 50GPa/ 100MPa LOW HEAT	ASPIRE® 50GPa/ 100MPa LATE AGE/ LOW HEAT	HIGH STRENGTH 100MPa @ 90 DAYS	HIGH STRENGTH 120MPa @ 90 DAYS
GWP	kg CO ₂ eq.	372	376	375	445	376	395	419	440
ODP	kg CFC11 eq	4.22E-06	4.34E-06	4.38E-06	4.33E-06	4.31E-06	4.28E-06	2.70E-06	4.23E-06
AP	kg SO ₂ eq	0.600	0.611	0.600	0.671	0.591	0.608	0.625	0.682
EP	kg PO ₄ ³⁻ eq	0.136	0.137	0.137	0.156	0.136	0.141	0.143	0.156
POCP	kg C ₂ H ₄ eq	0.0325	0.0333	0.0326	0.0351	0.0315	0.0318	0.0315	0.0366
ADPE	kg Sb eq	2.22E-05	2.45E-05	1.76E-05	1.77E-05	1.77E-05	1.78E-05	3.52E-05	3.21E-05
ADPF	MJ _{NCV}	2470	2510	2490	2760	2390	2430	2630	2850

TABLE 34. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	ASPIRE® 46GPa 65MPa	ASPIRE® 47GPa/ 80MPa	ASPIRE® 50GPa/ 100MPa	ASPIRE® 50GPa/ 100MPa High Early	ASPIRE® 50GPa/ 100MPa LOW HEAT	ASPIRE® 50GPa/ 100MPa LATE AGE/ LOW HEAT	HIGH STRENGTH 100MPa @ 90 DAYS	HIGH STRENGTH 120MPa @ 90 DAYS
PERE	MJ _{NCV}	9.55E+01	9.68E+01	9.52E+01	1.03E+02	8.80E+01	8.81E+01	1.11E+02	1.12E+02
PERM	MJ _{NCV}	2.55E-01	2.36E-01	2.55E-01	2.55E-01	2.59E-01	2.60E-01	2.64E-01	3.03E-01
PERT	MJ _{NCV}	9.57E+01	9.70E+01	9.54E+01	1.03E+02	8.83E+01	8.84E+01	1.11E+02	1.12E+02
PENRE	MJ _{NCV}	2.46E+03	2.50E+03	2.48E+03	2.75E+03	2.38E+03	2.42E+03	2.62E+03	2.84E+03
PENRM	MJ _{NCV}	1.89E+01	1.75E+01	1.89E+01	1.89E+01	1.92E+01	1.93E+01	3.05E+01	3.61E+01
PENRT	MJ _{NCV}	2.48E+03	2.52E+03	2.50E+03	2.77E+03	2.40E+03	2.44E+03	2.65E+03	2.87E+03
SM	kg	2.64E+02	2.92E+02	2.92E+02	1.95E+02	2.76E+02	2.47E+02	2.37E+02	2.27E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.17E+00	3.14E+00	3.15E+00	3.15E+00	3.05E+00	3.02E+00	3.01E+00	3.15E+00
HWD	kg	6.04E-05	5.94E-05	5.60E-05	5.60E-05	5.69E-05	5.71E-05	8.36E-05	8.91E-05
NHWD	kg	4.63E+00	5.42E+00	3.33E+00	3.31E+00	3.25E+00	3.22E+00	7.62E+00	6.27E+00
RWD	kg	6.69E-03	7.02E-03	5.66E-03	5.66E-03	5.75E-03	5.77E-03	1.11E-02	1.11E-02
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Sydney region

TABLE 35. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
GWP	kg CO ₂ eq.	245	276	309	351
ODP	kg CFC11 eq	2.09E-06	2.16E-06	2.24E-06	2.34E-06
AP	kg SO ₂ eq	0.378	0.415	0.454	0.503
EP	kg PO ₄ ³⁻ eq	0.0893	0.0983	0.108	0.12
POCP	kg C ₂ H ₄ eq	0.0182	0.0199	0.0217	0.024
ADPE	kg Sb eq	8.23E-06	9.20E-06	1.02E-05	1.12E-05
ADPF	MJ _{NCV}	1500	1670	1840	2060

TABLE 36. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
PERE	MJ _{NCV}	5.78E+01	6.38E+01	7.01E+01	7.79E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.78E+01	6.38E+01	7.01E+01	7.79E+01
PENRE	MJ _{NCV}	1.49E+03	1.66E+03	1.83E+03	2.05E+03
PENRM	MJ _{NCV}	1.13E+01	1.31E+01	1.45E+01	1.55E+01
PENRT	MJ _{NCV}	1.50E+03	1.67E+03	1.85E+03	2.07E+03
SM	kg	1.27E+02	1.32E+02	1.40E+02	1.47E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.99E+00	2.95E+00	2.90E+00	2.84E+00
HWD	kg	1.67E-05	1.91E-05	2.12E-05	2.29E-05
NHWD	kg	1.71E+00	1.89E+00	2.10E+00	2.34E+00
RWD	kg	3.18E-03	3.62E-03	4.01E-03	4.36E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Sydney region

TABLE 37. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	BLOCKFILL 20MPa GP/GGBFS/FA BLEND	BLOCKFILL 25MPa GP/GGBFS/FA BLEND	BLOCKFILL 32MPa GP/GGBFS/FA BLEND	BLOCKFILL 40MPa GP/GGBFS/FA BLEND
GWP	kg CO ₂ eq.	186	192	225	257
ODP	kg CFC11 eq	2.10E-06	2.10E-06	2.23E-06	2.33E-06
AP	kg SO ₂ eq	0.317	0.323	0.366	0.406
EP	kg PO ₄ ³⁻ eq	0.0735	0.0749	0.0851	0.0946
POCP	kg C ₂ H ₄ eq	0.0160	0.0164	0.0184	0.0205
ADPE	kg Sb eq	8.15E-06	9.07E-06	1.00E-05	1.11E-05
ADPF	MJ _{NCV}	1260	1300	1490	1690

TABLE 38. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	BLOCKFILL 20MPa GP/GGBFS/FA BLEND	BLOCKFILL 25MPa GP/GGBFS/FA BLEND	BLOCKFILL 32MPa GP/GGBFS/FA BLEND	BLOCKFILL 40MPa GP/GGBFS/FA BLEND
PERE	MJ _{NCV}	5.08E+01	5.23E+01	5.96E+01	6.73E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.08E+01	5.23E+01	5.96E+01	6.73E+01
PENRE	MJ _{NCV}	1.26E+03	1.29E+03	1.49E+03	1.68E+03
PENRM	MJ _{NCV}	1.13E+01	1.31E+01	1.45E+01	1.55E+01
PENRT	MJ _{NCV}	1.27E+03	1.30E+03	1.50E+03	1.70E+03
SM	kg	1.96E+02	2.01E+02	2.26E+02	2.44E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.99E+00	2.94E+00	2.89E+00	2.87E+00
HWD	kg	1.67E-05	1.91E-05	2.12E-05	2.29E-05
NHWD	kg	1.72E+00	1.88E+00	2.09E+00	2.35E+00
RWD	kg	3.18E-03	3.62E-03	4.01E-03	4.36E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Sydney region

TABLE 39. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	FIBRE 32MPa 20KG STEEL	FIBRE 40MPa 20KG STEEL	FIBRE 50MPa 20KG STEEL	FIBRE 32MPa 25KG STEEL
GWP	kg CO₂ eq.	331	353	423	339
ODP	kg CFC11 eq	4.02E-06	4.11E-06	4.32E-06	4.51E-06
AP	kg SO ₂ eq	0.634	0.661	0.745	0.684
EP	kg PO ₄ ³⁻ eq	0.151	0.157	0.178	0.163
POCP	kg C ₂ H ₄ eq	0.0317	0.0330	0.0371	0.0346
ADPE	kg Sb eq	0.0383	0.0383	0.0383	0.0479
ADPF	MJ _{NCV}	2120	2230	2620	2210

TABLE 40. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	FIBRE 32MPa 20KG STEEL	FIBRE 40MPa 20KG STEEL	FIBRE 50MPa 20KG STEEL	FIBRE 32MPa 25KG STEEL
PERE	MJ _{NCV}	9.19E+01	9.61E+01	1.10E+02	9.87E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	9.19E+01	9.61E+01	1.10E+02	9.87E+01
PENRE	MJ _{NCV}	2.16E+03	2.27E+03	2.66E+03	2.27E+03
PENRM	MJ _{NCV}	4.92E+00	4.92E+00	1.13E+01	4.92E+00
PENRT	MJ _{NCV}	2.16E+03	2.28E+03	2.67E+03	2.27E+03
SM	kg	6.47E+01	8.11E+01	1.15E+02	6.92E+01
RSF	MJ _{NCV}	6.72E+00	6.72E+00	6.72E+00	8.40E+00
NRSF	MJ _{NCV}	3.14E+00	3.14E+00	3.14E+00	3.93E+00
FW	m ³	3.71E+00	3.64E+00	3.51E+00	3.83E+00
HWD	kg	1.63E-02	1.63E-02	1.63E-02	2.04E-02
NHWD	kg	1.31E+01	1.32E+01	1.35E+01	1.61E+01
RWD	kg	2.51E-03	2.57E-03	3.90E-03	2.79E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Sydney region

TABLE 41. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	FIBRE 40MPa 25KG STEEL	FIBRE 50MPa 25KG STEEL	FIBRE 32MPa 30KG STEEL	FIBRE 40MPa 30KG STEEL	FIBRE 50MPa 30KG STEEL
GWP	kg CO₂ eq	361	431	347	369	439
ODP	kg CFC-11 eq	4.59E-06	4.80E-06	4.99E-06	5.08E-06	5.29E-06
AP	kg SO ₂ eq	0.711	0.795	0.735	0.761	0.845
EP	kg PO ₄ ---eq	0.169	0.190	0.175	0.181	0.202
POCP	kg C ₂ H ₄ eq	0.0359	0.0400	0.0376	0.0388	0.0429
ADPE	kg Sb eq	0.0479	0.0479	0.0575	0.0575	0.0575
ADPF	MJ	2330	2720	2310	2420	2820

TABLE 42. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	FIBRE 40MPa 25KG STEEL	FIBRE 50MPa 25KG STEEL	FIBRE 32MPa 30KG STEEL	FIBRE 40MPa 30KG STEEL	FIBRE 50MPa 30KG STEEL
PERE	MJ _{NCV}	1.03E+02	1.17E+02	1.05E+02	1.10E+02	1.24E+02
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	1.03E+02	1.17E+02	1.05E+02	1.10E+02	1.24E+02
PENRE	MJ _{NCV}	2.38E+03	2.77E+03	2.38E+03	2.49E+03	2.88E+03
PENRM	MJ _{NCV}	4.92E+00	1.13E+01	4.92E+00	4.92E+00	1.13E+01
PENRT	MJ _{NCV}	2.39E+03	2.78E+03	2.38E+03	2.50E+03	2.89E+03
SM	kg	8.56E+01	1.19E+02	7.36E+01	9.00E+01	1.24E+02
RSF	MJ _{NCV}	8.40E+00	8.40E+00	1.01E+01	1.01E+01	1.01E+01
NRSF	MJ _{NCV}	3.93E+00	3.93E+00	4.71E+00	4.71E+00	4.71E+00
FW	m ³	3.77E+00	3.63E+00	3.95E+00	3.89E+00	3.75E+00
HW	kg	2.04E-02	2.04E-02	2.45E-02	2.45E-02	2.45E-02
NHW	kg	1.62E+01	1.65E+01	1.91E+01	1.92E+01	1.95E+01
RW	kg	2.84E-03	4.18E-03	3.06E-03	3.11E-03	4.45E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 43. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	ENVIROCRETE® 30% 32MPa 20KG STEEL FIBRE	ENVIROCRETE® 30% 40MPa 20KG STEEL FIBRE	ENVIROCRETE® 30% 50MPa 20KG STEEL FIBRE	ENVIROCRETE® 30% 32MPa 25KG STEEL FIBRE	ENVIROCRETE® 30% 40MPa 25KG STEEL FIBRE
GWP	kg CO ₂ eq	283	334	414	291	342
ODP	kg CFC-11 eq	4.02E-06	4.19E-06	4.40E-06	4.51E-06	4.67E-06
AP	kg SO ₂ eq	0.579	0.64	0.74	0.629	0.69
EP	kg PO ₄ --- eq	0.138	0.153	0.177	0.15	0.165
POCP	kg C ₂ H ₄ eq	0.0294	0.0324	0.0373	0.0324	0.0353
ADPE	kg Sb eq	0.0383	0.0383	0.0383	0.0479	0.0479
ADPF	MJ	1890	2170	2630	1980	2270

TABLE 44. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	ENVIROCRETE® 30% 32MPa 20KG STEEL FIBRE	ENVIROCRETE® 30% 40MPa 20KG STEEL FIBRE	ENVIROCRETE® 30% 50MPa 20KG STEEL FIBRE	ENVIROCRETE® 30% 32MPa 25KG STEEL FIBRE	ENVIROCRETE® 30% 40MPa 25KG STEEL FIBRE
PERE	MJ _{NCV}	8.38E+01	9.47E+01	1.12E+02	9.06E+01	1.01E+02
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	8.38E+01	9.47E+01	1.12E+02	9.06E+01	1.01E+02
PENRE	MJ _{NCV}	1.93E+03	2.22E+03	2.67E+03	2.04E+03	2.33E+03
PENRM	MJ _{NCV}	7.76E+00	9.07E+00	1.51E+01	7.76E+00	9.07E+00
PENRT	MJ _{NCV}	1.94E+03	2.23E+03	2.68E+03	2.05E+03	2.33E+03
SM	kg	1.10E+02	1.41E+02	1.54E+02	1.14E+02	1.46E+02
RSF	MJ _{NCV}	6.72E+00	6.72E+00	6.72E+00	8.40E+00	8.40E+00
NRSF	MJ _{NCV}	3.14E+00	3.14E+00	3.14E+00	3.93E+00	3.93E+00
FW	m ³	3.65E+00	3.54E+00	3.49E+00	3.77E+00	3.67E+00
HW	kg	1.63E-02	1.63E-02	1.63E-02	2.04E-02	2.04E-02
NHW	kg	1.24E+01	1.25E+01	1.35E+01	1.54E+01	1.55E+01
RW	kg	2.54E-03	2.78E-03	4.63E-03	2.81E-03	3.05E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 45. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	ENVIROCRETE® 30% 50MPa 25KG STEEL FIBRE	ENVIROCRETE® 30% 32MPa 30KG STEEL FIBRE	ENVIROCRETE® 30% 40MPa 30KG STEEL FIBRE	ENVIROCRETE® 30% 50MPa 30KG STEEL FIBRE
GWP	kg CO ₂ eq.	422	299	350	430
ODP	kg CFC11 eq	4.88E-06	4.99E-06	5.15E-06	5.36E-06
AP	kg SO ₂ eq	0.790	0.679	0.740	0.841
EP	kg PO ₄ ³⁻ eq	0.189	0.162	0.177	0.201
POCP	kg C ₂ H ₄ eq	0.0402	0.0353	0.0383	0.0432
ADPE	kg Sb eq	0.0479	0.0575	0.0575	0.0575
ADPF	MJ _{NCV}	2730	2080	2370	2820

TABLE 46. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	ENVIROCRETE® 30% 50MPa 25KG STEEL FIBRE	ENVIROCRETE® 30% 32MPa 30KG STEEL FIBRE	ENVIROCRETE® 30% 40MPa 30KG STEEL FIBRE	ENVIROCRETE® 30% 50MPa 30KG STEEL FIBRE
PERE	MJ _{NCV}	1.19E+02	9.74E+01	1.08E+02	1.26E+02
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	1.19E+02	9.74E+01	1.08E+02	1.26E+02
PENRE	MJ _{NCV}	2.78E+03	2.15E+03	2.43E+03	2.89E+03
PENRM	MJ _{NCV}	1.51E+01	7.76E+00	9.07E+00	1.51E+01
PENRT	MJ _{NCV}	2.79E+03	2.15E+03	2.44E+03	2.90E+03
SM	kg	1.59E+02	1.18E+02	1.50E+02	1.63E+02
RSF	MJ _{NCV}	8.40E+00	1.01E+01	1.01E+01	1.01E+01
NRSF	MJ _{NCV}	3.93E+00	4.71E+00	4.71E+00	4.71E+00
FW	m ³	3.61E+00	3.90E+00	3.79E+00	3.74E+00
HWD	kg	2.04E-02	2.45E-02	2.45E-02	2.45E-02
NHWD	kg	1.65E+01	1.84E+01	1.85E+01	1.95E+01
RWD	kg	4.90E-03	3.08E-03	3.33E-03	5.17E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Sydney region

TABLE 47. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 32MPa 20KG STEEL FIBRE	ENVIROCRETE® PLUS 40MPa 20KG STEEL FIBRE	ENVIROCRETE® PLUS 50MPa 20KG STEEL FIBRE	ENVIROCRETE® PLUS 32MPa 25KG STEEL FIBRE	ENVIROCRETE® PLUS 40MPa 25KG STEEL FIBRE
GWP	kg CO₂ eq	249	301	343	257	309
ODP	kg CFC-11 eq	4.09E-06	4.16E-06	4.43E-06	4.58E-06	4.64E-06
AP	kg SO ₂ eq	0.566	0.629	0.691	0.616	0.679
EP	kg PO ₄ --- eq	0.130	0.145	0.158	0.142	0.157
POCP	kg C ₂ H ₄ eq	0.0297	0.0326	0.0358	0.0326	0.0356
ADPE	kg Sb eq	0.0383	0.0383	0.0383	0.0479	0.0479
ADPF	MJ	1850	2130	2400	1950	2230

TABLE 48. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	ENVIROCRETE® PLUS 32MPa 20KG STEEL FIBRE	ENVIROCRETE® PLUS 40MPa 20KG STEEL FIBRE	ENVIROCRETE® PLUS 50MPa 20KG STEEL FIBRE	ENVIROCRETE® PLUS 32MPa 25KG STEEL FIBRE	ENVIROCRETE® PLUS 40MPa 25KG STEEL FIBRE
PERE	MJ _{NCV}	8.65E+01	9.75E+01	1.09E+02	9.33E+01	1.04E+02
PERM	MJ _{NCV}	0.00E+00	2.89E-02	4.81E-02	0.00E+00	2.89E-02
PERT	MJ _{NCV}	8.65E+01	9.75E+01	1.09E+02	9.33E+01	1.04E+02
PENRE	MJ _{NCV}	1.89E+03	2.18E+03	2.45E+03	2.00E+03	2.28E+03
PENRM	MJ _{NCV}	5.13E+00	9.79E+00	4.36E+00	5.13E+00	9.79E+00
PENRT	MJ _{NCV}	1.90E+03	2.18E+03	2.45E+03	2.01E+03	2.29E+03
SM	kg	1.73E+02	1.75E+02	2.46E+02	1.78E+02	1.79E+02
RSF	MJ _{NCV}	6.72E+00	6.72E+00	6.72E+00	8.40E+00	8.40E+00
NRSF	MJ _{NCV}	3.14E+00	3.14E+00	3.14E+00	3.93E+00	3.93E+00
FW	m ³	3.74E+00	3.69E+00	3.60E+00	3.86E+00	3.82E+00
HW	kg	1.63E-02	1.63E-02	1.63E-02	2.04E-02	2.04E-02
NHW	kg	1.30E+01	1.36E+01	1.39E+01	1.60E+01	1.66E+01
RW	kg	2.42E-03	3.72E-03	2.87E-03	2.69E-03	3.99E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 49. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	ENVIROCRETE PLUS® 50MPa 25KG STEEL FIBRE	ENVIROCRETE PLUS® 32MPa 30KG STEEL FIBRE	ENVIROCRETE PLUS® 40MPa 30KG STEEL FIBRE	ENVIROCRETE PLUS® 50MPa 30KG STEEL FIBRE
GWP	kg CO ₂ eq.	351	265	317	360
ODP	kg CFC11 eq	4.92E-06	5.06E-06	5.13E-06	5.40E-06
AP	kg SO ₂ eq	0.741	0.666	0.729	0.791
EP	kg PO ₄ ³⁻ eq	0.170	0.154	0.168	0.181
POCP	kg C ₂ H ₄ eq	0.0387	0.0355	0.0385	0.0416
ADPE	kg Sb eq	0.0479	0.0575	0.0575	0.0575
ADPF	MJ _{NCV}	2500	2040	2330	2600

TABLE 50. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	ENVIROCRETE PLUS® 50MPa 25KG STEEL FIBRE	ENVIROCRETE PLUS® 32MPa 30KG STEEL FIBRE	ENVIROCRETE PLUS® 40MPa 30KG STEEL FIBRE	ENVIROCRETE PLUS® 50MPa 30KG STEEL FIBRE
PERE	MJ _{NCV}	1.16E+02	1.00E+02	1.11E+02	1.22E+02
PERM	MJ _{NCV}	4.81E-02	0.00E+00	2.89E-02	4.81E-02
PERT	MJ _{NCV}	1.16E+02	1.00E+02	1.11E+02	1.22E+02
PENRE	MJ _{NCV}	2.56E+03	2.11E+03	2.39E+03	2.67E+03
PENRM	MJ _{NCV}	4.36E+00	5.13E+00	9.79E+00	4.36E+00
PENRT	MJ _{NCV}	2.56E+03	2.12E+03	2.40E+03	2.67E+03
SM	kg	2.50E+02	1.82E+02	1.84E+02	2.55E+02
RSF	MJ _{NCV}	8.40E+00	1.01E+01	1.01E+01	1.01E+01
NRSF	MJ _{NCV}	3.93E+00	4.71E+00	4.71E+00	4.71E+00
FW	m ³	3.72E+00	3.98E+00	3.94E+00	3.84E+00
HWD	kg	2.04E-02	2.45E-02	2.45E-02	2.45E-02
NHWD	kg	1.69E+01	1.90E+01	1.96E+01	1.99E+01
RWD	kg	3.14E-03	2.96E-03	4.27E-03	3.41E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Sydney region

TABLE 51. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Indicator	Unit	ENVISIA® 32MPa 20KG STEEL FIBRE	ENVISIA® 40MPa 20KG STEEL FIBRE	ENVISIA® 50MPa 20KG STEEL FIBRE	ENVISIA® 32MPa 25KG STEEL FIBRE	ENVISIA® 40MPa 25KG STEEL FIBRE
GWP	kg CO₂ eq	225	283	336	233	291
ODP	kg CFC-11 eq	4.03E-06	4.25E-06	4.38E-06	4.52E-06	4.73E-06
AP	kg SO ₂ eq	0.538	0.615	0.681	0.588	0.665
EP	kg PO ₄ --- eq	0.123	0.140	0.156	0.135	0.152
POCP	kg C ₂ H ₄ eq	0.0284	0.0323	0.0353	0.0314	0.0352
ADPE	kg Sb eq	0.0383	0.0383	0.0383	0.0479	0.0479
ADPF	MJ	1740	2090	2380	1830	2190

TABLE 52. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M³

Parameter	Unit	ENVISIA® 32MPa 20KG STEEL FIBRE	ENVISIA® 40MPa 20KG STEEL FIBRE	ENVISIA® 50MPa 20KG STEEL FIBRE	ENVISIA® 32MPa 25KG STEEL FIBRE	ENVISIA® 40MPa 25KG STEEL FIBRE
PERE	MJ _{NCV}	8.23E+01	9.60E+01	1.07E+02	8.91E+01	1.03E+02
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	8.23E+01	9.60E+01	1.07E+02	8.91E+01	1.03E+02
PENRE	MJ _{NCV}	1.78E+03	2.13E+03	2.42E+03	1.89E+03	2.24E+03
PENRM	MJ _{NCV}	5.26E+00	8.20E+00	9.29E+00	5.26E+00	8.20E+00
PENRT	MJ _{NCV}	1.79E+03	2.14E+03	2.43E+03	1.89E+03	2.25E+03
SM	kg	1.92E+02	2.34E+02	2.46E+02	1.97E+02	2.38E+02
RSF	MJ _{NCV}	6.72E+00	6.72E+00	6.72E+00	8.40E+00	8.40E+00
NRSF	MJ _{NCV}	3.14E+00	3.14E+00	3.14E+00	3.93E+00	3.93E+00
FW	m ³	3.72E+00	3.66E+00	3.60E+00	3.85E+00	3.78E+00
HW	kg	1.63E-02	1.63E-02	1.63E-02	2.04E-02	2.04E-02
NHW	kg	1.28E+01	1.33E+01	1.36E+01	1.58E+01	1.63E+01
RW	kg	2.32E-03	3.18E-03	3.56E-03	2.59E-03	3.45E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Sydney region

TABLE 53. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	ENVISIA® 50MPa 25KG STEEL FIBRE	ENVISIA® 32MPa 30KG STEEL FIBRE	ENVISIA® 40MPa 30KG STEEL FIBRE	ENVISIA® 50MPa 30KG STEEL FIBRE
GWP	kg CO₂ eq.	344	242	299	352
ODP	kg CFC11 eq	4.86E-06	5.00E-06	5.21E-06	5.34E-06
AP	kg SO ₂ eq	0.731	0.638	0.715	0.781
EP	kg PO ₄ ³⁻ eq	0.168	0.147	0.164	0.179
POCP	kg C ₂ H ₄ eq	0.0383	0.0343	0.0381	0.0412
ADPE	kg Sb eq	0.0479	0.0575	0.0575	0.0575
ADPF	MJ _{NCV}	2470	1930	2280	2570

TABLE 54. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Parameter	Unit	ENVISIA® 50MPa 25KG STEEL FIBRE	ENVISIA® 32MPa 30KG STEEL FIBRE	ENVISIA® 40MPa 30KG STEEL FIBRE	ENVISIA® 50MPa 30KG STEEL FIBRE
PERE	MJ _{NCV}	1.13E+02	9.59E+01	1.10E+02	1.20E+02
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	1.13E+02	9.59E+01	1.10E+02	1.20E+02
PENRE	MJ _{NCV}	2.53E+03	2.00E+03	2.35E+03	2.64E+03
PENRM	MJ _{NCV}	9.29E+00	5.26E+00	8.20E+00	9.29E+00
PENRT	MJ _{NCV}	2.54E+03	2.00E+03	2.36E+03	2.65E+03
SM	kg	2.50E+02	2.01E+02	2.43E+02	2.54E+02
RSF	MJ _{NCV}	8.40E+00	1.01E+01	1.01E+01	1.01E+01
NRSF	MJ _{NCV}	3.93E+00	4.71E+00	4.71E+00	4.71E+00
FW	m ³	3.73E+00	3.97E+00	3.91E+00	3.85E+00
HWD	kg	2.04E-02	2.45E-02	2.45E-02	2.45E-02
NHWD	kg	1.66E+01	1.88E+01	1.93E+01	1.96E+01
RWD	kg	3.83E-03	2.86E-03	3.73E-03	4.10E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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



Newcastle region

Environmental profiles and parameters

Product table list

Newcastle region

In each region, we start with presenting a summary of the cradle-to-gate carbon footprint (GWP summary) of our concrete mixes.

Normal class concrete products

Table no. 1 and 2.....50

- NORMAL CLASS GP BLEND 20MPa
- NORMAL CLASS GP BLEND 25MPa
- NORMAL CLASS GP BLEND 32MPa
- NORMAL CLASS GP BLEND 40MPa
- NORMAL CLASS GP BLEND 50MPa

Table no. 3 and 4..... 51

- NORMAL CLASS GP/FA BLEND 25MPa
- NORMAL CLASS GP/FA BLEND 20MPa
- NORMAL CLASS GP/FA BLEND 32MPa
- NORMAL CLASS GP/FA BLEND 40MPa
- NORMAL CLASS GP/FA BLEND 50MPa

Table no. 5 and 6.....52

- NORMAL CLASS GP/GGBFS BLEND 20MPa
- NORMAL CLASS GP/GGBFS BLEND 25MPa
- NORMAL CLASS GP/GGBFS BLEND 32MPa
- NORMAL CLASS GP/GGBFS BLEND 40MPa
- NORMAL CLASS GP/GGBFS BLEND 50MPa

Lower carbon concrete products

Table no. 7 and 8..... 53

- ENVIROCRETE® 30% 20MPa
- ENVIROCRETE® 30% 25MPa
- ENVIROCRETE® 30% 32MPa
- ENVIROCRETE® 30% 40MPa
- ENVIROCRETE® 30% 50MPa

Table no. 9 and 10.....54

- ENVIROCRETE® 40% 20MPa
- ENVIROCRETE® 40% 25MPa
- ENVIROCRETE® 40% 32MPa
- ENVIROCRETE® 40% 40MPa
- ENVIROCRETE® 40% 50MPa

Table no. 11 and 12..... 55

- ENVIROCRETE® PLUS 20MPa
- ENVIROCRETE® PLUS 25MPa
- ENVIROCRETE® PLUS 32MPa
- ENVIROCRETE® PLUS 40MPa
- ENVIROCRETE® PLUS 50MPa

Table no. 13 and 14.....56

- ENVISIA® 32MPa
- ENVISIA® 40MPa
- ENVISIA® 50MPa
- ENVISIA® 65MPa

Concrete for special applications

Table no. 15 and 16.....57

- POST TENSIONED 40MPa 22@3
- POST TENSIONED 40MPa 22@4
- POST TENSIONED 40MPa 22@5
- HIGH SLUMP 50MPa
- HIGH SLUMP 65MPa
- HIGH SLUMP 80MPa

Table no. 17 and 18.....58

- TREMIE 40MPa
- TREMIE 50MPa
- TREMIE 65MPa
- HIGH WORKABILITY 65MPa
- SHOTCRETE 40MPa
- KERB MACHINE 25MPa
- KERB MACHINE 32MPa

Table no. 19 and 20..... 59

- NO FINES 6:1
- STABILISED SAND 14:1
- STABILISED SAND 8:1
- STABILISED SAND 4:1
- THERMAL FTB 45
- THERMAL FTB 60

Table no. 21 and 22.....60

- TfNSW B80 40MPa 20MM PUMP B1 EXPOSURE
- TfNSW B80 40MPa 20MM PUMP B2 EXPOSURE
- TfNSW B80 40MPa 20MM TREMIE B2 EXPOSURE
- TfNSW B80 50MPa 10MM TREMIE CFA C1 EXPOSURE
- TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE
- HIGH WORKABILITY S65; (HWC) 10; 465MM SPREAD C1

Table no. 23 and 24..... 61

- TfNSW R82 5MPa 20MM HAND/MACHINE PLACE
- TfNSW R83 35MPa 20MM HAND/MACHINE PLACE
- ROAD AUTHORITY RA60 10 BSPR
- ROAD AUTHORITY RA65 10 BSPR
- ROAD AUTHORITY RA50 20 HWC 475

Table no. 25 and 26..... 62

- BLOCKFILL 20MPa GP/FA BLEND
- BLOCKFILL 25MPa GP/FA BLEND
- BLOCKFILL32MPa GP/FA BLEND
- BLOCKFILL40MPa GP/FA BLEND

Table no. 27 and 28..... 63

- BLOCKFILL 20MPa GP/GGBFS/FA BLEND
- BLOCKFILL 25MPa GP/GGBFS/FA BLEND
- BLOCKFILL 32MPa GP/GGBFS/FA BLEND
- BLOCKFILL 40MPa GP/GGBFS/FA BLEND

Cradle-to-gate GWP-GHG summary (kg CO₂ eq / m³)

Newcastle region

NORMAL GP BLEND 20MPa	NORMAL GP BLEND 25MPa	NORMAL GP BLEND 32MPa	NORMAL GP BLEND 40MPa	NORMAL GP BLEND 50MPa		
259	275	301	344	438		
NORMAL GP/ FA BLEND 20MPa	NORMAL GP/ FA BLEND 25MPa	NORMAL GP/ FA BLEND 32MPa	NORMAL GP/ FA BLEND 40MPa	NORMAL GP/ FA BLEND 50MPa		
195	217	246	319	404		
NORMAL GP/ GGBFS BLEND 20MPa	NORMAL GP/ GGBFS BLEND 25MPa	NORMAL GP/ GGBFS BLEND 32MPa	NORMAL GP/ GGBFS BLEND 40MPa	NORMAL GP/ GGBFS BLEND 50MPa		
185	196	214	243	308		
ENVIROCRETE® 30% 20MPa	ENVIROCRETE® 30% 25MPa	ENVIROCRETE® 30% 32MPa	ENVIROCRETE® 30% 40MPa	ENVIROCRETE® 30% 50MPa		
198	217	248	304	377		
ENVIROCRETE® 40% 20MPa	ENVIROCRETE® 40% 25MPa	ENVIROCRETE® 40% 32MPa	ENVIROCRETE® 40% 40MPa	ENVIROCRETE® 40% 50MPa		
180	196	226	271	338		
ENVIROCRETE® PLUS 20MPa	ENVIROCRETE® PLUS 25MPa	ENVIROCRETE® PLUS 32MPa	ENVIROCRETE® PLUS 40MPa	ENVIROCRETE® PLUS 50MPa		
174	188	214	256	322		
ENVISIA® 32MPa	ENVISIA® 40MPa	ENVISIA® 50MPa	ENVISIA® 65MPa			
192	244	318	325			
POST TENSIONED 40MPa 22@3	POST TENSIONED 40MPa 22@4	POST TENSIONED 40MPa 22@5	HIGH SLUMP 50MPa	HIGH SLUMP 65MPa	HIGH SLUMP 80MPa	
330	318	310	421	465	481	
TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	HIGH WORKABILITY 65MPa	SHOTCRETE 40MPa 10MM	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
294	365	455	399	342	241	275
NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1	THERMAL FTB 45	THERMAL FTB 60	
190	70	121	207	59	71	

Cradle-to-gate GWP-GHG summary (kg CO₂ eq / m³)

Newcastle region

TfNSW B80 40MPa 20MM PUMP B1 EXPOSURE	TfNSW B80 40MPa 20MM PUMP B2 EXPOSURE	TfNSW B80 40MPa 20MM TREMIE B2 EXPOSURE	TfNSW B80 50MPa 10MM TREMIE CFA C1 EXPOSURE	TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE	HIGH WORKABILITY S65; (HWC) 10; 465mm SPREAD C1
303	309	318	337	420	413
TfNSW R82 5MPa 20MM HAND PLACE	TfNSW R83 40MPa 20MM HAND PLACE	TfNSW R82 5MPa 20MM HAND PLACE	ROAD AUTHORITY RA65 10 BSPR	ROAD AUTHORITY RA50 20 HWC 475	
99	307	413	413	221	
BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND		
242	273	306	348		
BLOCKFILL 20MPa GP/GGBFS/FA BLEND	BLOCKFILL 25MPa GP/GGBFS/FA BLEND	BLOCKFILL 32MPa GP/GGBFS/FA BLEND	BLOCKFILL 40MPa GP/GGBFS/FA BLEND		
182	187	221	253		

Newcastle region

TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M³

Indicator	Unit	NORMAL CLASS GP BLEND 20 MPa	NORMAL CLASS GP BLEND 25 MPa	NORMAL CLASS GP BLEND 32 MPa	NORMAL CLASS GP BLEND 40 MPa	NORMAL CLASS GP BLEND 50 MPa
GWP	kg CO ₂ eq.	259	275	301	344	438
ODP	kg CFC11 eq	2.36E-06	2.41E-06	2.46E-06	2.55E-06	2.79E-06
AP	kg SO ₂ eq	0.377	0.398	0.428	0.480	0.594
EP	kg PO ₄ ³⁻ eq	0.0894	0.0945	0.102	0.115	0.143
POCP	kg C ₂ H ₄ eq	0.0191	0.0200	0.0214	0.0236	0.0287
ADPE	kg Sb eq	3.66E-06	3.78E-06	4.16E-06	4.98E-06	6.25E-06
ADPF	MJ _{NCV}	1510	1600	1740	1960	2460

TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M³

Parameter	Unit	NORMAL CLASS GP BLEND 20 MPa	NORMAL CLASS GP BLEND 25 MPa	NORMAL CLASS GP BLEND 32 MPa	NORMAL CLASS GP BLEND 40 MPa	NORMAL CLASS GP BLEND 50 MPa
PERE	MJ _{NCV}	5.20E+01	5.52E+01	6.00E+01	6.83E+01	8.62E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.20E+01	5.52E+01	6.00E+01	6.83E+01	8.62E+01
PENRE	MJ _{NCV}	1.51E+03	1.60E+03	1.73E+03	1.96E+03	2.45E+03
PENRM	MJ _{NCV}	5.84E+00	6.03E+00	6.69E+00	8.29E+00	1.09E+01
PENRT	MJ _{NCV}	1.52E+03	1.60E+03	1.74E+03	1.97E+03	2.46E+03
SM	kg	9.04E+00	9.69E+00	1.07E+01	1.23E+01	1.58E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.00E+00	2.99E+00	2.96E+00	2.90E+00	2.86E+00
HWD	kg	7.64E-06	7.88E-06	8.76E-06	1.08E-05	1.41E-05
NHWD	kg	7.28E-01	7.58E-01	8.35E-01	9.87E-01	1.22E+00
RWD	kg	1.41E-03	1.46E-03	1.62E-03	2.00E-03	2.59E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Newcastle region

TABLE 3. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M³

Indicator	Unit	NORMAL CLASS GP / FA BLEND 20 MPa	NORMAL CLASS GP / FA BLEND 25 MPa	NORMAL CLASS GP / FA BLEND 32 MPa	NORMAL CLASS GP / FA BLEND 40 MPa	NORMAL CLASS GP / FA BLEND 50 MPa
GWP	kg CO₂ eq.	195	217	246	319	404
ODP	kg CFC11 eq	2.23E-06	2.28E-06	2.35E-06	2.52E-06	2.74E-06
AP	kg SO ₂ eq	0.302	0.328	0.364	0.451	0.554
EP	kg PO ₄ ³⁻ eq	0.0709	0.0772	0.0860	0.107	0.133
POCP	kg C ₂ H ₄ eq	0.0159	0.0170	0.0186	0.0224	0.0270
ADPE	kg Sb eq	3.51E-06	3.65E-06	4.04E-06	4.92E-06	6.17E-06
ADPF	MJ _{NCV}	1190	1300	1460	1840	2290

TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M³

Parameter	Unit	NORMAL CLASS GP / FA BLEND 20 MPa	NORMAL CLASS GP / FA BLEND 25 MPa	NORMAL CLASS GP / FA BLEND 32 MPa	NORMAL CLASS GP / FA BLEND 40 MPa	NORMAL CLASS GP / FA BLEND 50 MPa
PERE	MJ _{NCV}	4.05E+01	4.44E+01	5.00E+01	6.37E+01	8.01E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.05E+01	4.44E+01	5.00E+01	6.37E+01	8.01E+01
PENRE	MJ _{NCV}	1.19E+03	1.30E+03	1.45E+03	1.83E+03	2.28E+03
PENRM	MJ _{NCV}	5.84E+00	6.03E+00	6.69E+00	8.29E+00	1.09E+01
PENRT	MJ _{NCV}	1.19E+03	1.30E+03	1.46E+03	1.84E+03	2.29E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	9.45E+01	9.77E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.97E+00	2.97E+00	2.94E+00	2.89E+00	2.85E+00
HWD	kg	7.64E-06	7.88E-06	8.76E-06	1.08E-05	1.41E-05
NHWD	kg	6.66E-01	7.00E-01	7.82E-01	9.62E-01	1.19E+00
RWD	kg	1.41E-03	1.46E-03	1.62E-03	2.00E-03	2.59E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Newcastle region

TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M³

Indicator	Unit	NORMAL CLASS GP / GGBFS BLEND 20 MPa	NORMAL CLASS GP / GGBFS BLEND 25 MPa	NORMAL CLASS GP / GGBFS BLEND 32 MPa	NORMAL CLASS GP / GGBFS BLEND 40 MPa	NORMAL CLASS GP / GGBFS BLEND 50 MPa
GWP	kg CO ₂ eq.	185	196	214	243	308
ODP	kg CFC11 eq	3.10E-06	3.20E-06	3.33E-06	3.55E-06	4.08E-06
AP	kg SO ₂ eq	0.455	0.481	0.520	0.585	0.729
EP	kg PO ₄ ³⁻ eq	0.0793	0.0837	0.0901	0.101	0.125
POCP	kg C ₂ H ₄ eq	0.0216	0.0226	0.0242	0.0269	0.0329
ADPE	kg Sb eq	3.56E-06	3.67E-06	4.04E-06	4.84E-06	6.07E-06
ADPF	MJ _{NCV}	1330	1410	1530	1720	2150

TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M³

Parameter	Unit	NORMAL CLASS GP / GGBFS BLEND 20 MPa	NORMAL CLASS GP / GGBFS BLEND 25 MPa	NORMAL CLASS GP / GGBFS BLEND 32 MPa	NORMAL CLASS GP / GGBFS BLEND 40 MPa	NORMAL CLASS GP / GGBFS BLEND 50 MPa
PERE	MJ _{NCV}	4.03E+01	4.26E+01	4.63E+01	5.25E+01	6.58E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.03E+01	4.26E+01	4.63E+01	5.25E+01	6.58E+01
PENRE	MJ _{NCV}	1.33E+03	1.41E+03	1.52E+03	1.72E+03	2.14E+03
PENRM	MJ _{NCV}	5.84E+00	6.03E+00	6.69E+00	8.29E+00	1.09E+01
PENRT	MJ _{NCV}	1.34E+03	1.41E+03	1.53E+03	1.72E+03	2.15E+03
SM	kg	1.22E+02	1.31E+02	1.44E+02	1.65E+02	2.13E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.01E+00	3.00E+00	2.98E+00	2.91E+00	2.88E+00
HWD	kg	7.64E-06	7.88E-06	8.76E-06	1.08E-05	1.41E-05
NHWD	kg	6.51E-01	6.76E-01	7.45E-01	8.83E-01	1.09E+00
RWD	kg	1.41E-03	1.46E-03	1.62E-03	2.00E-03	2.59E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Newcastle region

TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M³

Indicator	Unit	ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
GWP	kg CO ₂ eq.	198	217	248	304	377
ODP	kg CFC11 eq	2.24E-06	2.29E-06	2.35E-06	2.67E-06	2.90E-06
AP	kg SO ₂ eq	0.306	0.328	0.366	0.445	0.536
EP	kg PO ₄ ³⁻ eq	0.0717	0.0772	0.0865	0.104	0.126
POCP	kg C ₂ H ₄ eq	0.0161	0.0170	0.0187	0.0225	0.0266
ADPE	kg Sb eq	3.52E-06	3.65E-06	4.04E-06	4.93E-06	6.16E-06
ADPF	MJ _{NCV}	1200	1300	1460	1810	2200

TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M³

Parameter	Unit	ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
PERE	MJ _{NCV}	4.10E+01	4.44E+01	5.03E+01	6.29E+01	7.74E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.10E+01	4.44E+01	5.03E+01	6.29E+01	7.74E+01
PENRE	MJ _{NCV}	1.20E+03	1.30E+03	1.46E+03	1.80E+03	2.20E+03
PENRM	MJ _{NCV}	5.84E+00	6.03E+00	6.69E+00	8.29E+00	1.09E+01
PENRT	MJ _{NCV}	1.21E+03	1.30E+03	1.47E+03	1.81E+03	2.21E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	1.23E+02	1.36E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.98E+00	2.98E+00	2.94E+00	2.86E+00	2.77E+00
HWD	kg	7.64E-06	7.88E-06	8.76E-06	1.08E-05	1.41E-05
NHWD	kg	6.68E-01	7.00E-01	7.83E-01	9.73E-01	1.19E+00
RWD	kg	1.41E-03	1.46E-03	1.62E-03	2.00E-03	2.59E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Newcastle region

TABLE 9. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M³

Indicator	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
GWP	kg CO ₂ eq.	180	196	226	271	338
ODP	kg CFC11 eq	2.47E-06	2.51E-06	2.78E-06	2.80E-06	3.12E-06
AP	kg SO ₂ eq	0.301	0.320	0.366	0.421	0.517
EP	kg PO ₄ ³⁻ eq	0.0676	0.0723	0.0828	0.0955	0.117
POCP	kg C ₂ H ₄ eq	0.0162	0.0170	0.0193	0.0218	0.0266
ADPE	kg Sb eq	3.30E-06	3.46E-06	4.04E-06	7.56E-06	1.22E-05
ADPF	MJ _{NCV}	1160	1240	1420	1680	2100

TABLE 10. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M³

Parameter	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
PERE	MJ _{NCV}	3.92E+01	4.22E+01	4.89E+01	5.96E+01	7.70E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	3.92E+01	4.22E+01	4.89E+01	5.97E+01	7.71E+01
PENRE	MJ _{NCV}	1.15E+03	1.24E+03	1.42E+03	1.67E+03	2.09E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	MJ _{NCV}	1.16E+03	1.24E+03	1.42E+03	1.68E+03	2.10E+03
SM	kg	1.28E+02	1.29E+02	1.30E+02	1.51E+02	1.83E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.01E+00	2.99E+00	2.96E+00	2.90E+00	2.79E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	8.34E-01	8.86E-01	1.04E+00	1.76E+00	2.62E+00
RWD	kg	8.62E-04	8.90E-04	1.01E-03	2.18E-03	3.87E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Newcastle region

TABLE 11. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
GWP	kg CO ₂ eq.	174	188	214	256	322
ODP	kg CFC11 eq	2.70E-06	2.73E-06	2.81E-06	2.98E-06	3.40E-06
AP	kg SO ₂ eq	0.307	0.325	0.358	0.417	0.517
EP	kg PO ₄ ³⁻ eq	0.0674	0.0716	0.0793	0.0927	0.114
POCP	kg C ₂ H ₄ eq	0.0168	0.0176	0.0191	0.0220	0.0271
ADPE	kg Sb eq	3.34E-06	3.49E-06	3.97E-06	7.57E-06	1.22E-05
ADPF	MJ _{NCV}	1170	1250	1390	1650	2080

TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M³

Parameter	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
PERE	MJ _{NCV}	4.00E+01	4.29E+01	4.80E+01	5.88E+01	7.66E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	4.00E+01	4.29E+01	4.80E+01	5.88E+01	7.67E+01
PENRE	MJ _{NCV}	1.17E+03	1.25E+03	1.39E+03	1.65E+03	2.08E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	MJ _{NCV}	1.17E+03	1.25E+03	1.39E+03	1.65E+03	2.09E+03
SM	kg	1.26E+02	1.32E+02	1.38E+02	1.49E+02	2.06E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.07E+00	3.05E+00	3.00E+00	2.97E+00	2.87E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	8.55E-01	9.09E-01	1.04E+00	1.77E+00	2.64E+00
RWD	kg	8.62E-04	8.90E-04	1.01E-03	2.18E-03	3.87E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Newcastle region

TABLE 13. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M³

Indicator	Unit	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
GWP	kg CO₂ eq.	192	244	318	325
ODP	kg CFC11 eq	3.78E-06	3.98E-06	4.03E-06	4.44E-06
AP	kg SO ₂ eq	0.390	0.467	0.552	0.568
EP	kg PO ₄ ³⁻ eq	0.0795	0.0961	0.117	0.120
POCP	kg C ₂ H ₄ eq	0.0222	0.0259	0.0298	0.0300
ADPE	kg Sb eq	2.66E-06	8.26E-06	1.34E-05	1.38E-06
ADPF	MJ _{NCV}	1510	1840	2220	2240

TABLE 14. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M³

Parameter	Unit	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
PERE	MJ _{NCV}	5.31E+01	6.64E+01	8.26E+01	7.83E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	9.14E-02	0.00E+00
PERT	MJ _{NCV}	5.31E+01	6.64E+01	8.27E+01	7.83E+01
PENRE	MJ _{NCV}	1.51E+03	1.84E+03	2.21E+03	2.24E+03
PENRM	MJ _{NCV}	7.27E+00	1.26E+01	1.54E+01	0.00E+00
PENRT	MJ _{NCV}	1.52E+03	1.85E+03	2.23E+03	2.24E+03
SM	kg	2.32E+02	2.53E+02	2.37E+02	2.81E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.11E+00	2.95E+00	2.94E+00	2.99E+00
HWD	kg	7.79E-06	1.76E-05	3.34E-05	0.00E+00
NHWD	kg	4.49E-01	1.74E+00	2.80E+00	5.83E-01
RWD	kg	1.36E-03	3.29E-03	4.60E-03	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Newcastle region

TABLE 15. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Indicator	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
GWP	kg CO ₂ eq.	330	318	310	421	465	481
ODP	kg CFC11 eq	2.78E-06	2.52E-06	2.52E-06	2.71E-06	2.81E-06	3.15E-06
AP	kg SO ₂ eq	0.478	0.447	0.438	0.572	0.637	0.687
EP	kg PO ₄ ³⁻ eq	0.113	0.107	0.105	0.137	0.150	0.159
POCP	kg C ₂ H ₄ eq	0.0241	0.0222	0.0218	0.0281	0.0314	0.0398
ADPE	kg Sb eq	8.10E-06	2.73E-06	2.68E-06	6.21E-06	1.43E-05	6.97E-06
ADPF	MJ _{NCV}	1920	1820	1780	2380	2640	2790

TABLE 16. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Parameter	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
PERE	MJ _{NCV}	6.68E+01	6.28E+01	6.13E+01	8.38E+01	9.46E+01	1.25E+02
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	6.68E+01	6.28E+01	6.13E+01	8.38E+01	9.46E+01	1.25E+02
PENRE	MJ _{NCV}	1.92E+03	1.82E+03	1.78E+03	2.38E+03	2.64E+03	2.80E+03
PENRM	MJ _{NCV}	8.41E+00	7.65E+00	7.46E+00	1.03E+01	1.07E+01	2.35E+01
PENRT	MJ _{NCV}	1.93E+03	1.83E+03	1.79E+03	2.39E+03	2.65E+03	2.82E+03
SM	kg	5.32E+01	5.29E+01	5.78E+01	8.80E+01	5.84E+01	7.92E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.35E+00	2.96E+00	2.96E+00	2.80E+00	2.84E+00	1.41E+01
HWD	kg	1.38E-05	8.20E-06	8.00E-06	1.70E-05	2.63E-05	2.52E-05
NHWD	kg	1.85E+00	3.80E-01	3.72E-01	1.11E+00	3.32E+00	6.04E-01
RWD	kg	2.70E-03	1.43E-03	1.39E-03	2.98E-03	4.98E-03	4.39E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Newcastle region

TABLE 17. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Indicator	Unit	TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	HIGH WORKABILITY 65MPa	SHOTCRETE 40MPa 10MM	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
GWP	kg CO ₂ eq.	294	365	455	399	342	241	275
ODP	kg CFC11 eq	2.51E-06	2.65E-06	2.86E-06	2.65E-06	2.45E-06	2.32E-06	2.30E-06
AP	kg SO ₂ eq	0.429	0.514	0.634	0.560	0.471	0.354	0.390
EP	kg PO ₄ ³⁻ eq	0.100	0.122	0.150	0.132	0.114	0.0841	0.0935
POCP	kg C ₂ H ₄ eq	0.0217	0.0257	0.0317	0.0276	0.0230	0.0181	0.0196
ADPE	kg Sb eq	9.62E-06	1.23E-05	2.32E-05	1.63E-05	3.17E-06	2.41E-06	2.92E-06
ADPF	Mj _{NCV}	1720	2120	2650	2300	1950	1420	1590

TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Parameter	Unit	TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	HIGH WORKABILITY 65MPa	SHOTCRETE 40MPa 10MM	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
PERE	Mj _{NCV}	6.24E+01	7.74E+01	1.00E+02	8.28E+01	6.75E+01	4.83E+01	5.47E+01
PERM	Mj _{NCV}	9.62E-02	9.62E-02	1.83E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	6.25E+01	7.75E+01	1.01E+02	8.28E+01	6.75E+01	4.83E+01	5.47E+01
PENRE	Mj _{NCV}	1.72E+03	2.11E+03	2.63E+03	2.30E+03	1.94E+03	1.42E+03	1.59E+03
PENRM	Mj _{NCV}	7.13E+00	1.53E+01	2.50E+01	1.58E+01	9.53E+00	7.08E+00	9.09E+00
PENRT	Mj _{NCV}	1.73E+03	2.13E+03	2.66E+03	2.31E+03	1.95E+03	1.43E+03	1.60E+03
SM	kg	1.35E+02	1.53E+02	9.94E+01	1.65E+02	1.27E+02	1.02E+02	8.25E+01
RSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.00E+00	2.86E+00	2.88E+00	2.70E+00	2.70E+00	3.09E+00	2.98E+00
HWD	kg	2.35E-05	3.29E-05	5.97E-05	2.78E-05	1.02E-05	7.85E-06	1.00E-05
NHWD	kg	2.08E+00	2.37E+00	4.68E+00	3.76E+00	4.11E-01	3.00E-01	3.41E-01
RWD	kg	2.70E-03	4.37E-03	7.89E-03	5.49E-03	1.78E-03	1.36E-03	1.74E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00

Newcastle region

TABLE 19. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Indicator	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1	THERMAL FTB 45	THERMAL FTB 60
GWP	kg CO ₂ eq.	190	70	121	207	59	71
ODP	kg CFC11 eq	2.07E-06	1.17E-06	1.33E-06	1.53E-06	1.99E-06	1.92E-06
AP	kg SO ₂ eq	0.289	0.119	0.181	0.285	0.139	0.150
EP	kg PO ₄ ³⁻ eq	0.0684	0.0272	0.0424	0.0686	0.0306	0.0334
POCP	kg C ₂ H ₄ eq	0.0151	0.00652	0.00924	0.0140	0.00872	0.00905
ADPE	kg Sb eq	1.80E-06	1.87E-07	3.02E-07	1.93E-06	4.27E-07	4.38E-07
ADPF	MJ _{NCV}	1140	445	710	1180	466	519

TABLE 20. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Parameter	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1	THERMAL FTB 45	THERMAL FTB 60
PERE	MJ _{NCV}	3.92E+01	1.40E+01	2.32E+01	4.06E+01	1.38E+01	1.59E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.92E+01	1.40E+01	2.32E+01	4.06E+01	1.38E+01	1.59E+01
PENRE	MJ _{NCV}	1.14E+03	4.45E+02	7.10E+02	1.18E+03	4.66E+02	5.19E+02
PENRM	MJ _{NCV}	4.59E+00	0.00E+00	0.00E+00	6.31E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.15E+03	4.45E+02	7.10E+02	1.18E+03	4.66E+02	5.19E+02
SM	kg	4.81E+01	4.39E+01	6.66E+01	1.11E+02	1.26E+02	1.11E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.38E+00	2.44E+00	2.46E+00	2.32E+00	3.20E+00	3.05E+00
HWD	kg	4.92E-06	2.59E-07	2.59E-07	7.03E-06	0.00E+00	0.00E+00
NHWD	kg	2.43E-01	8.37E-02	1.33E-01	2.50E-01	8.84E-02	9.93E-02
RWD	kg	8.57E-04	3.87E-05	3.87E-05	1.22E-03	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Newcastle region

TABLE 21. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Indicator	Unit	TfNSW B80 40MPa 20MM PUMP B1 EXPOSURE	TfNSW B80 40MPa 20MM PUMP B2 EXPOSURE	TfNSW B80 40MPa 20MM TREMIE B2 EXPOSURE	TfNSW B80 50MPa 10MM TREMIE CFA C1 EXPOSURE	TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE	HIGH WORKABILITY S65; (HWC) 10; 465mm SPREAD C1
GWP	kg CO ₂ eq.	303	309	318	337	420	413
ODP	kg CFC11 eq	2.52E-06	2.63E-06	2.69E-06	2.70E-06	2.73E-06	2.81E-06
AP	kg SO ₂ eq	0.435	0.446	0.469	0.498	0.569	0.576
EP	kg PO ₄ ³⁻ eq	0.103	0.106	0.110	0.116	0.138	0.137
POCP	kg C ₂ H ₄ eq	0.0219	0.0226	0.0242	0.0259	0.0279	0.0285
ADPE	kg Sb eq	6.07E-06	6.47E-06	1.51E-05	2.19E-05	5.95E-06	1.35E-05
ADPF	MJ _{NCV}	1770	1810	1910	2040	2400	2390

TABLE 22. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Parameter	Unit	TfNSW B80 40MPa 20MM PUMP B1 EXPOSURE	TfNSW B80 40MPa 20MM PUMP B2 EXPOSURE	TfNSW B80 40MPa 20MM TREMIE B2 EXPOSURE	TfNSW B80 50MPa 10MM TREMIE CFA C1 EXPOSURE	TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE	HIGH WORKABILITY S65; (HWC) 10; 465mm SPREAD C1
PERE	MJ _{NCV}	6.14E+01	6.32E+01	7.04E+01	7.91E+01	8.46E+01	8.50E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	8.46E-02	2.02E-01	0.00E+00	0.00E+00
PERT	MJ _{NCV}	6.14E+01	6.32E+01	7.05E+01	7.93E+01	8.46E+01	8.50E+01
PENRE	MJ _{NCV}	1.76E+03	1.81E+03	1.90E+03	2.03E+03	2.39E+03	2.38E+03
PENRM	MJ _{NCV}	9.43E+00	1.10E+01	1.81E+01	2.28E+01	2.08E+01	1.86E+01
PENRT	MJ _{NCV}	1.77E+03	1.82E+03	1.92E+03	2.06E+03	2.41E+03	2.40E+03
SM	kg	1.25E+02	1.30E+02	1.20E+02	1.36E+02	9.82E+01	1.65E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.93E+00	2.94E+00	3.04E+00	3.03E+00	2.77E+00	2.91E+00
HWD	kg	1.29E-05	1.45E-05	3.69E-05	5.86E-05	2.23E-05	2.75E-05
NHWD	kg	1.21E+00	1.22E+00	3.01E+00	4.32E+00	5.45E-01	2.81E+00
RWD	kg	2.41E-03	2.70E-03	5.40E-03	7.31E-03	3.89E-03	5.24E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Newcastle region

TABLE 23. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Indicator	Unit	TfNSW R82 5MPa 20MM HAND PLACE	TfNSW R83 40MPa 20MM HAND PLACE	ROAD AUTHORITY RA60 10 BSPR	ROAD AUTHORITY RA65 10 BSPR	ROAD AUTHORITY RA50 20 HWC 475
GWP	kg CO₂ eq.	99	307	413	413	221
ODP	kg CFC11 eq	2.05E-06	2.68E-06	2.81E-06	2.81E-06	2.40E-06
AP	kg SO ₂ eq	0.190	0.451	0.576	0.576	0.361
EP	kg PO ₄ ³⁻ eq	0.0428	0.106	0.137	0.137	0.0813
POCP	kg C ₂ H ₄ eq	0.0111	0.0231	0.0285	0.0285	0.0205
ADPE	kg Sb eq	3.47E-06	1.07E-05	1.35E-05	1.35E-05	1.30E-05
ADPF	MJ _{NCV}	695	1830	2390	2390	1590

TABLE 24. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Parameter	Unit	TfNSW R82 5MPa 20MM HAND PLACE	TfNSW R83 40MPa 20MM HAND PLACE	ROAD AUTHORITY RA60 10 BSPR	ROAD AUTHORITY RA65 10 BSPR	ROAD AUTHORITY RA50 20 HWC 475
PERE	MJ _{NCV}	2.29E+01	6.55E+01	8.50E+01	8.50E+01	6.31E+01
PERM	MJ _{NCV}	0.00E+00	4.23E-02	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.29E+01	6.55E+01	8.50E+01	8.50E+01	6.31E+01
PENRE	MJ _{NCV}	6.93E+02	1.82E+03	2.38E+03	2.38E+03	1.58E+03
PENRM	MJ _{NCV}	4.69E+00	1.45E+01	1.86E+01	1.86E+01	1.52E+01
PENRT	MJ _{NCV}	6.98E+02	1.84E+03	2.40E+03	2.40E+03	1.59E+03
SM	kg	1.64E+02	1.25E+02	1.65E+02	1.65E+02	3.44E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.99E+00	3.12E+00	2.91E+00	2.91E+00	2.79E+00
HWD	kg	6.80E-06	2.56E-05	2.75E-05	2.75E-05	2.44E-05
NHWD	kg	6.84E-01	2.08E+00	2.81E+00	2.81E+00	2.98E+00
RWD	kg	1.29E-03	4.02E-03	5.24E-03	5.24E-03	4.72E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Newcastle region

TABLE 25. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Indicator	Unit	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
GWP	kg CO ₂ eq.	242	273	306	348
ODP	kg CFC11 eq	2.37E-06	2.43E-06	2.49E-06	2.57E-06
AP	kg SO ₂ eq	0.366	0.403	0.443	0.493
EP	kg PO ₄ ³⁻ eq	0.0857	0.0949	0.105	0.117
POCP	kg C ₂ H ₄ eqv	0.0191	0.0207	0.0225	0.0247
ADPE	kg Sb eq	8.21E-06	9.18E-06	1.01E-05	1.12E-05
ADPF	MJ _{NCV}	1470	1640	1810	2030

TABLE 26. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Parameter	Unit	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
PERE	MJ _{NCV}	5.18E+01	5.79E+01	6.45E+01	7.24E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.18E+01	5.79E+01	6.45E+01	7.24E+01
PENRE	MJ _{NCV}	1.46E+03	1.63E+03	1.80E+03	2.02E+03
PENRM	MJ _{NCV}	1.13E+01	1.31E+01	1.45E+01	1.55E+01
PENRT	MJ _{NCV}	1.47E+03	1.64E+03	1.82E+03	2.04E+03
SM	kg	1.27E+02	1.32E+02	1.40E+02	1.47E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.77E+00	2.73E+00	2.69E+00	2.63E+00
HWD	kg	1.67E-05	1.91E-05	2.12E-05	2.29E-05
NHWD	kg	1.67E+00	1.85E+00	2.05E+00	2.30E+00
RWD	kg	3.18E-03	3.62E-03	4.01E-03	4.36E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Newcastle region

TABLE 27. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Indicator	Unit	BLOCKFILL 20MPa GP/GGBFS/FA BLEND	BLOCKFILL 25MPa GP/GGBFS/FA BLEND	BLOCKFILL 32MPa GP/GGBFS/FA BLEND	BLOCKFILL 40MPa GP/GGBFS/FA BLEND
GWP	kg CO₂ eq.	182	187	221	253
ODP	kg CFC11 eq	2.26E-06	2.25E-06	2.33E-06	2.41E-06
AP	kg SO ₂ eq	0.299	0.305	0.347	0.388
EP	kg PO ₄ ³⁻ eq	0.0686	0.0701	0.0802	0.0898
POCP	kg C ₂ H ₄ eqv	0.0166	0.0169	0.0189	0.0209
ADPE	kg Sb eq	8.13E-06	9.05E-06	1.00E-05	1.11E-05
ADPF	MJ _{NCV}	1220	1250	1450	1640

TABLE 28. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M³

Parameter	Unit	BLOCKFILL 20MPa GP/GGBFS/FA BLEND	BLOCKFILL 25MPa GP/GGBFS/FA BLEND	BLOCKFILL 32MPa GP/GGBFS/FA BLEND	BLOCKFILL 40MPa GP/GGBFS/FA BLEND
PERE	MJ _{NCV}	4.47E+01	4.63E+01	5.37E+01	6.16E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.47E+01	4.63E+01	5.37E+01	6.16E+01
PENRE	MJ _{NCV}	1.21E+03	1.25E+03	1.44E+03	1.63E+03
PENRM	MJ _{NCV}	1.13E+01	1.31E+01	1.45E+01	1.55E+01
PENRT	MJ _{NCV}	1.22E+03	1.26E+03	1.45E+03	1.65E+03
SM	kg	1.96E+02	2.01E+02	2.26E+02	2.44E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.77E+00	2.72E+00	2.68E+00	2.65E+00
HWD	kg	1.67E-05	1.91E-05	2.12E-05	2.29E-05
NHWD	kg	1.67E+00	1.83E+00	2.05E+00	2.31E+00
RWD	kg	3.18E-03	3.62E-03	4.01E-03	4.36E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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



Wollongong region

Environmental profiles and parameters

Product table list

Wollongong region

In each region, we start with presenting a summary of the cradle-to-gate carbon footprint (GWP summary) of our concrete mixes.

Normal class concrete products

Table No. 1 and 267

- NORMAL CLASS GP BLEND 20 MPa
- NORMAL CLASS GP BLEND 25 MPa
- NORMAL CLASS GP BLEND 32 MPa
- NORMAL CLASS GP BLEND 40 MPa
- NORMAL CLASS GP BLEND 50 MPa

Table No. 3 and 4 68

- NORMAL CLASS GP / FA BLEND 20 MPa
- NORMAL CLASS GP / FA BLEND 25 MPa
- NORMAL CLASS GP / FA BLEND 32 MPa
- NORMAL CLASS GP / FA BLEND 40 MPa
- NORMAL CLASS GP / FA BLEND 50 MPa

Table No. 5 and 6 69

- NORMAL CLASS GP / GGBFS BLEND 20 MPa
- NORMAL CLASS GP / GGBFS BLEND 25 MPa
- NORMAL CLASS GP / GGBFS BLEND 32 MPa
- NORMAL CLASS GP / GGBFS BLEND 40 MPa
- NORMAL CLASS GP / GGBFS BLEND 50 MPa

Table No. 7 and 8.....70

- NORMAL CLASS GP / GGBFS / FA BLEND 20 MPa
- NORMAL CLASS GP / GGBFS / FA BLEND 25 MPa
- NORMAL CLASS GP / GGBFS / FA BLEND 32 MPa
- NORMAL CLASS GP / GGBFS / FA BLEND 40 MPa
- NORMAL CLASS GP / GGBFS / FA BLEND 50 MPa

Lower carbon concrete products

Table No. 9 and 1071

- ENVIROCRETE® 30% 20 MPa
- ENVIROCRETE® 30% 25 MPa
- ENVIROCRETE® 30% 32 MPa
- ENVIROCRETE® 30% 40 MPa
- ENVIROCRETE® 30% 50 MPa

Table No. 11 and 12.....72

- ENVIROCRETE® 40% 20 MPa
- ENVIROCRETE® 40% 25 MPa
- ENVIROCRETE® 40% 32 MPa
- ENVIROCRETE® 40% 40 MPa
- ENVIROCRETE® 40% 50 MPa

Table No. 13 and 1473

- ENVIROCRETE® PLUS 20 MPa
- ENVIROCRETE® PLUS 25 MPa
- ENVIROCRETE® PLUS 32 MPa
- ENVIROCRETE® PLUS 40 MPa
- ENVIROCRETE® PLUS 50 MPa

Table No. 15 and 1674

- ENVISIA® 20 MPa
- ENVISIA® 25 MPa
- ENVISIA® 32 MPa
- ENVISIA® 40 MPa
- ENVISIA® 50 MPa
- ENVISIA® 65 MPa

Concrete for special applications

Table No 17 and 1875

- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- POST TENSIONED 40 MPa 22@5
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- HIGH SLUMP 80 MPa

Table No. 19 and 2076

- TREMIE 40 MPa
- TREMIE 50 MPa
- TREMIE 65 MPa
- SHOTCRETE 40 MPa
- KERB MACHINE 25 MPa
- KERB MACHINE 32 MPa

Table No. 21 and 2277

- NO FINES 6:1
- STABILISED SAND 14:1
- STABILISED SAND 8:1
- STABILISED SAND 4:1
- THERMAL FTB 45
- THERMAL FTB 60

Table No. 23 and 24.....78

- TfNSW B80 40 MPa PUMP B1 EXPOSURE
- TfNSW B80 40 MPa PUMP B2 EXPOSURE
- TfNSW B80 40 MPa TREMIE B2 EXPOSURE
- TfNSW B80 50 MPa TREMIE CFA C1 EXPOSURE

Table No. 25 and 2679

- TfNSW B80 50 MPa TREMIE B2 EXPOSURE
- TfNSW R82 5 MPa HAND / MACHINE PLACED
- TfNSW R83 35 MPa HAND / MACHINE PLACED

Table No. 27 and 28 80

- BLOCKFILL 20MPa GP/FA BLEND
- BLOCKFILL 25MPa GP/FA BLEND
- BLOCKFILL32MPa GP/FA BLEND
- BLOCKFILL40MPa GP/FA BLEND

Table No. 29 and 30 81

- BLOCKFILL 20MPa GP/GGBFS/FA BLEND
- BLOCKFILL 25MPa GP/GGBFS/FA BLEND
- BLOCKFILL 32MPa GP/GGBFS/FA BLEND
- BLOCKFILL 40MPa GP/GGBFS/FA BLEND

Cradle-to-gate GWP-GHG summary (kg CO₂ eq / m³)

Wollongong region

NORMAL GP BLEND 20MPa	NORMAL GP BLEND 25MPa	NORMAL GP BLEND 32MPa	NORMAL GP BLEND 40MPa	NORMAL GP BLEND 50MPa	
263	280	306	348	442	
NORMAL GP/FA BLEND 20MPa	NORMAL GP/FA BLEND 25MPa	NORMAL GP/FA BLEND 32MPa	NORMAL GP/FA BLEND 40MPa	NORMAL GP/FA BLEND 50MPa	
202	223	253	325	411	
NORMAL GP/ GGBFS BLEND 20MPa	NORMAL GP/ GGBFS BLEND 25MPa	NORMAL GP/ GGBFS BLEND 32MPa	NORMAL GP/ GGBFS BLEND 40MPa	NORMAL GP/ GGBFS BLEND 50MPa	
184	195	212	240	303	
NORMAL GP/ GGBFS/FA BLEND 20MPa	NORMAL GP/ GGBFS/FA BLEND 25MPa	NORMAL GP/ GGBFS/FA BLEND 32MPa	NORMAL GP/ GGBFS/FA BLEND 40MPa	NORMAL GP/ GGBFS/FA BLEND 50MPa	
145	159	181	251	370	
ENVIROCRETE® 30% 20MPa	ENVIROCRETE® 30% 25MPa	ENVIROCRETE® 30% 32MPa	ENVIROCRETE® 30% 40MPa	ENVIROCRETE® 30% 50MPa	
202	223	253	305	382	
ENVIROCRETE® 40% 20MPa	ENVIROCRETE® 40% 25MPa	ENVIROCRETE® 40% 32MPa	ENVIROCRETE® 40% 40MPa	ENVIROCRETE® 40% 50MPa	
183	199	229	273	339	
ENVIROCRETE® PLUS 20MPa	ENVIROCRETE® PLUS 25MPa	ENVIROCRETE® PLUS 32MPa	ENVIROCRETE® PLUS 40MPa	ENVIROCRETE® PLUS 50MPa	
178	194	219	263	328	
ENVISIA® 20MPa	ENVISIA® 25MPa	ENVISIA® 32MPa	ENVISIA® 40MPa	ENVISIA® 50MPa	ENVISIA® 65MPa
168	175	188	241	314	319
POST TENSIONED 40MPa 22@3	POST TENSIONED 40MPa 22@4	POST TENSIONED 40MPa 22@5	HIGH SLUMP 50MPa	HIGH SLUMP 65MPa	HIGH SLUMP 80MPa
333	324	316	422	491	521
TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	SHOTCRETE 40MPa 10MM	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
305	372	464	368	250	284
NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 4:1	STABILISED SAND 8:1	THERMAL FTB 45	THERMAL FTB 60
232	62	309	181	65	77
TfNSW B80 40MPa 20MM PUMP B1 EXPOSURE	TfNSW B80 40MPa 20MM PUMP B2 EXPOSURE	TfNSW B80 40MPa 20MM TREMIE B2 EXPOSURE	TfNSW B80 50MPa 10MM TREMIE CFA C1 EXPOSURE		
308	315	324	344		

Cradle-to-gate GWP-GHG summary (kg CO₂ eq / m³)

Wollongong region

TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE	TfNSW R82 5MPa 20MM HAND PLACE	TfNSW R83 35MPa 20MM HAND/ MACHINE PLACE		
402	108	283		
BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND	
253	280	314	356	
BLOCKFILL 20MPa GP/GGBFS/FA BLEND	BLOCKFILL 25MPa GP/GGBFS/FA BLEND	BLOCKFILL 32MPa GP/GGBFS/FA BLEND	BLOCKFILL 40MPa GP/GGBFS/FA BLEND	
177	192	243	260	

Wollongong region

TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M³

Indicator	Unit	NORMAL CLASS GP BLEND 20 MPa	NORMAL CLASS GP BLEND 25 MPa	NORMAL CLASS GP BLEND 32 MPa	NORMAL CLASS GP BLEND 40 MPa	NORMAL CLASS GP BLEND 50 MPa
GWP	kg CO ₂ eq.	263	280	306	348	442
ODP	kg CFC11 eq	2.95E-06	3.01E-06	3.08E-06	3.21E-06	3.56E-06
AP	kg SO ₂ eq	0.403	0.423	0.453	0.503	0.616
EP	kg PO ₄ ³⁻ eq	0.0947	0.0997	0.107	0.119	0.147
POCP	kg C ₂ H ₄ eq	0.0222	0.0231	0.0245	0.0267	0.0319
ADPE	kg Sb eq	2.29E-06	2.43E-06	2.65E-06	3.02E-06	3.65E-06
ADPF	MJ _{NCV}	1570	1660	1800	2020	2520

TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M³

Parameter	Unit	NORMAL CLASS GP BLEND 20 MPa	NORMAL CLASS GP BLEND 25 MPa	NORMAL CLASS GP BLEND 32 MPa	NORMAL CLASS GP BLEND 40 MPa	NORMAL CLASS GP BLEND 50 MPa
PERE	MJ _{NCV}	5.19E+01	5.50E+01	5.95E+01	6.74E+01	8.45E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.19E+01	5.50E+01	5.95E+01	6.74E+01	8.45E+01
PENRE	MJ _{NCV}	1.57E+03	1.66E+03	1.79E+03	2.02E+03	2.51E+03
PENRM	MJ _{NCV}	5.84E+00	6.31E+00	7.08E+00	8.32E+00	1.02E+01
PENRT	MJ _{NCV}	1.58E+03	1.67E+03	1.80E+03	2.03E+03	2.52E+03
SM	kg	9.04E+00	9.69E+00	1.07E+01	1.23E+01	1.58E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.03E+00	3.00E+00	2.95E+00	2.89E+00	2.85E+00
HWD	kg	6.26E-06	6.77E-06	7.59E-06	8.93E-06	1.10E-05
NHWD	kg	3.18E-01	3.36E-01	3.63E-01	4.10E-01	5.08E-01
RWD	kg	1.09E-03	1.18E-03	1.32E-03	1.55E-03	1.91E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Wollongong region

TABLE 3. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M³

Indicator	Unit	NORMAL CLASS GP / FA BLEND 20 MPa	NORMAL CLASS GP / FA BLEND 25 MPa	NORMAL CLASS GP / FA BLEND 32 MPa	NORMAL CLASS GP / FA BLEND 40 MPa	NORMAL CLASS GP / FA BLEND 50 MPa
GWP	kg CO ₂ eq.	202	223	253	325	411
ODP	kg CFC11 eq	3.04E-06	3.07E-06	3.16E-06	3.42E-06	3.73E-06
AP	kg SO ₂ eq	0.338	0.362	0.397	0.484	0.587
EP	kg PO ₄ ³⁻ eq	0.0783	0.0843	0.0929	0.114	0.140
POCP	kg C ₂ H ₄ eq	0.0195	0.0205	0.0221	0.0261	0.0308
ADPE	kg Sb eq	2.15E-06	2.30E-06	2.53E-06	2.97E-06	3.58E-06
ADPF	MJ _{NCV}	1280	1380	1540	1920	2370

TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M³

Parameter	Unit	NORMAL CLASS GP / FA BLEND 20 MPa	NORMAL CLASS GP / FA BLEND 25 MPa	NORMAL CLASS GP / FA BLEND 32 MPa	NORMAL CLASS GP / FA BLEND 40 MPa	NORMAL CLASS GP / FA BLEND 50 MPa
PERE	MJ _{NCV}	4.05E+01	4.43E+01	4.97E+01	6.29E+01	7.84E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.05E+01	4.43E+01	4.97E+01	6.29E+01	7.84E+01
PENRE	MJ _{NCV}	1.27E+03	1.38E+03	1.54E+03	1.92E+03	2.37E+03
PENRM	MJ _{NCV}	5.84E+00	6.31E+00	7.08E+00	8.32E+00	1.02E+01
PENRT	MJ _{NCV}	1.28E+03	1.39E+03	1.54E+03	1.93E+03	2.38E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	9.45E+01	9.77E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.00E+00	2.98E+00	2.92E+00	2.89E+00	2.84E+00
HWD	kg	6.26E-06	6.77E-06	7.59E-06	8.93E-06	1.10E-05
NHWD	kg	2.56E-01	2.78E-01	3.09E-01	3.85E-01	4.75E-01
RWD	kg	1.09E-03	1.18E-03	1.32E-03	1.55E-03	1.91E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Wollongong region

TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M³

Indicator	Unit	NORMAL CLASS GP / GGBFS BLEND 20 MPa	NORMAL CLASS GP / GGBFS BLEND 25 MPa	NORMAL CLASS GP / GGBFS BLEND 32 MPa	NORMAL CLASS GP / GGBFS BLEND 40 MPa	NORMAL CLASS GP / GGBFS BLEND 50 MPa
GWP	kg CO ₂ eq.	184	195	212	240	303
ODP	kg CFC11 eq	2.90E-06	2.95E-06	3.02E-06	3.14E-06	3.46E-06
AP	kg SO ₂ eq	0.320	0.334	0.355	0.391	0.472
EP	kg PO ₄ ³⁻ eq	0.0732	0.0766	0.0817	0.090	0.110
POCP	kg C ₂ H ₄ eq	0.0192	0.0199	0.0209	0.0226	0.0266
ADPE	kg Sb eq	2.19E-06	2.33E-06	2.54E-06	2.89E-06	3.48E-06
ADPF	MJ _{NCV}	1260	1330	1430	1600	1970

TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M³

Parameter	Unit	NORMAL CLASS GP / GGBFS BLEND 20 MPa	NORMAL CLASS GP / GGBFS BLEND 25 MPa	NORMAL CLASS GP / GGBFS BLEND 32 MPa	NORMAL CLASS GP / GGBFS BLEND 40 MPa	NORMAL CLASS GP / GGBFS BLEND 50 MPa
PERE	MJ _{NCV}	4.32E+01	4.57E+01	4.93E+01	5.57E+01	6.93E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.32E+01	4.57E+01	4.93E+01	5.57E+01	6.93E+01
PENRE	MJ _{NCV}	1.26E+03	1.32E+03	1.42E+03	1.59E+03	1.96E+03
PENRM	MJ _{NCV}	5.84E+00	6.31E+00	7.08E+00	8.32E+00	1.02E+01
PENRT	MJ _{NCV}	1.26E+03	1.33E+03	1.43E+03	1.60E+03	1.97E+03
SM	kg	1.17E+02	1.26E+02	1.38E+02	1.59E+02	2.05E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.02E+00	3.00E+00	2.94E+00	2.89E+00	2.84E+00
HWD	kg	6.26E-06	6.77E-06	7.59E-06	8.93E-06	1.10E-05
NHWD	kg	3.36E-01	3.56E-01	3.84E-01	4.35E-01	5.40E-01
RWD	kg	1.09E-03	1.18E-03	1.32E-03	1.55E-03	1.91E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Wollongong region

TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M³

Indicator	Unit	NORMAL CLASS GP / GGBFS / FA BLEND 20 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 25 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 32 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 40 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 50 MPa
GWP	kg CO ₂ eq.	145	159	181	251	370
ODP	kg CFC11 eq	3.05E-06	3.11E-06	3.21E-06	3.39E-06	3.65E-06
AP	kg SO ₂ eq	0.283	0.301	0.330	0.411	0.548
EP	kg PO ₄ ³⁻ eq	0.0630	0.0674	0.0742	0.0943	0.129
POCP	kg C ₂ H ₄ eq	0.0176	0.0185	0.0199	0.0235	0.0296
ADPE	kg Sb eq	4.03E-06	4.34E-06	4.82E-06	5.66E-06	7.90E-06
ADPF	MJ _{NCV}	1060	1140	1280	1630	2230

TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M³

Parameter	Unit	NORMAL CLASS GP / GGBFS / FA BLEND 20MPa	NORMAL CLASS GP / GGBFS / FA BLEND 25 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 32 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 40 MPa	NORMAL CLASS GP / GGBFS / FA BLEND 50 MPa
PERE	MJ _{NCV}	3.48E+01	3.80E+01	4.29E+01	5.53E+01	7.57E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.48E+01	3.80E+01	4.29E+01	5.53E+01	7.57E+01
PENRE	MJ _{NCV}	1.06E+03	1.14E+03	1.27E+03	1.63E+03	2.22E+03
PENRM	MJ _{NCV}	5.83E+00	6.31E+00	7.08E+00	8.32E+00	1.51E+01
PENRT	MJ _{NCV}	1.06E+03	1.15E+03	1.28E+03	1.64E+03	2.24E+03
SM	kg	1.90E+02	2.00E+02	2.17E+02	2.01E+02	1.34E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.01E+00	2.98E+00	2.93E+00	2.89E+00	2.86E+00
HWD	kg	8.09E-06	8.75E-06	9.82E-06	1.15E-05	1.93E-05
NHWD	kg	8.22E-01	8.91E-01	1.00E+00	1.19E+00	1.42E+00
RWD	kg	1.52E-03	1.64E-03	1.84E-03	2.17E-03	3.54E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Wollongong region

TABLE 9. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M³

Indicator	Unit	ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
GWP	kg CO ₂ eq.	202	223	253	305	382
ODP	kg CFC11 eq	3.04E-06	3.07E-06	3.16E-06	3.49E-06	3.71E-06
AP	kg SO ₂ eq	0.338	0.362	0.397	0.466	0.557
EP	kg PO ₄ ³⁻ eq	0.0783	0.0843	0.0929	0.109	0.132
POCP	kg C ₂ H ₄ eq	0.0195	0.0205	0.0221	0.0256	0.0297
ADPE	kg Sb eq	2.15E-06	2.30E-06	2.53E-06	2.96E-06	3.55E-06
ADPF	Mj _{NCV}	1280	1380	1540	1850	2260

TABLE 10. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M³

Parameter	Unit	ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
PERE	Mj _{NCV}	4.05E+01	4.43E+01	4.97E+01	6.09E+01	7.53E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	4.05E+01	4.43E+01	4.97E+01	6.09E+01	7.53E+01
PENRE	Mj _{NCV}	1.27E+03	1.38E+03	1.54E+03	1.85E+03	2.26E+03
PENRM	Mj _{NCV}	5.84E+00	6.31E+00	7.08E+00	8.32E+00	1.02E+01
PENRT	Mj _{NCV}	1.28E+03	1.39E+03	1.54E+03	1.85E+03	2.27E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	1.23E+02	1.36E+02
RSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.00E+00	2.98E+00	2.92E+00	3.02E+00	2.84E+00
HWD	kg	6.26E-06	6.77E-06	7.59E-06	8.93E-06	1.10E-05
NHWD	kg	2.56E-01	2.78E-01	3.09E-01	3.92E-01	4.82E-01
RWD	kg	1.09E-03	1.18E-03	1.32E-03	1.55E-03	1.91E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Wollongong region

TABLE 11. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M³

Indicator	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
GWP	kg CO₂ eq.	183	199	229	273	339
ODP	kg CFC11 eq	3.02E-06	3.07E-06	3.20E-06	3.36E-06	3.61E-06
AP	kg SO ₂ eq	0.321	0.341	0.378	0.436	0.521
EP	kg PO ₄ ³⁻ eq	0.0728	0.0777	0.0866	0.0999	0.120
POCP	kg C ₂ H ₄ eq	0.0190	0.0199	0.0216	0.0245	0.0288
ADPE	kg Sb eq	3.35E-06	3.51E-06	4.03E-06	7.58E-06	1.22E-05
ADPF	MJ _{NCV}	1200	1280	1450	1710	2110

TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M³

Parameter	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
PERE	MJ _{NCV}	3.81E+01	4.11E+01	4.77E+01	5.77E+01	7.41E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	3.81E+01	4.11E+01	4.77E+01	5.77E+01	7.42E+01
PENRE	MJ _{NCV}	1.19E+03	1.28E+03	1.45E+03	1.71E+03	2.10E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	MJ _{NCV}	1.20E+03	1.28E+03	1.45E+03	1.71E+03	2.11E+03
SM	kg	1.29E+02	1.30E+02	1.30E+02	1.52E+02	1.84E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.91E+00	2.89E+00	3.01E+00	2.82E+00	2.72E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	8.30E-01	8.83E-01	1.03E+00	1.75E+00	2.61E+00
RWD	kg	8.62E-04	8.90E-04	1.01E-03	2.18E-03	3.87E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Wollongong region

TABLE 13. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
GWP	kg CO ₂ eq.	178	194	219	263	328
ODP	kg CFC11 eq	3.07E-06	3.13E-06	3.23E-06	3.39E-06	3.69E-06
AP	kg SO ₂ eq	0.331	0.351	0.383	0.442	0.535
EP	kg PO ₄ ³⁻ eq	0.0722	0.0769	0.0844	0.0977	0.118
POCP	kg C ₂ H ₄ eq	0.0196	0.0205	0.0220	0.0249	0.0296
ADPE	kg Sb eq	3.42E-06	3.59E-06	4.07E-06	7.65E-06	1.23E-05
ADPF	MJ _{NCV}	1220	1310	1450	1710	2120

TABLE 14. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M³

Parameter	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
PERE	MJ _{NCV}	4.00E+01	4.32E+01	4.82E+01	5.90E+01	7.63E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	4.00E+01	4.32E+01	4.82E+01	5.90E+01	7.63E+01
PENRE	MJ _{NCV}	1.22E+03	1.31E+03	1.45E+03	1.70E+03	2.12E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	MJ _{NCV}	1.22E+03	1.31E+03	1.45E+03	1.71E+03	2.13E+03
SM	kg	1.26E+02	1.32E+02	1.38E+02	1.49E+02	2.06E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.07E+00	3.04E+00	3.01E+00	2.96E+00	2.79E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	8.56E-01	9.12E-01	1.05E+00	1.77E+00	2.64E+00
RWD	kg	8.62E-04	8.90E-04	1.01E-03	2.18E-03	3.87E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Wollongong region

TABLE 15. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M³

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
GWP	kg CO ₂ eq.	168	175	188	241	314	319
ODP	kg CFC11 eq	3.20E-06	3.26E-06	3.35E-06	3.63E-06	3.72E-06	3.92E-06
AP	kg SO ₂ eq	0.346	0.359	0.380	0.459	0.542	0.549
EP	kg PO ₄ ³⁻ eq	0.0713	0.0737	0.0778	0.0949	0.115	0.116
POCP	kg C ₂ H ₄ eq	0.0210	0.0217	0.0228	0.0269	0.0306	0.0302
ADPE	kg Sb eq	2.38E-06	2.50E-06	2.73E-06	8.34E-06	1.34E-05	1.41E-06
ADPF	MJ _{NCV}	1310	1360	1460	1800	2170	2170

TABLE 16. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M³

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
PERE	MJ _{NCV}	4.63E+01	4.86E+01	5.25E+01	6.59E+01	8.12E+01	7.71E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.14E-02	0.00E+00
PERT	MJ _{NCV}	4.63E+01	4.86E+01	5.25E+01	6.59E+01	8.13E+01	7.71E+01
PENRE	MJ _{NCV}	1.30E+03	1.36E+03	1.46E+03	1.79E+03	2.16E+03	2.17E+03
PENRM	MJ _{NCV}	6.12E+00	6.50E+00	7.27E+00	1.26E+01	1.54E+01	0.00E+00
PENRT	MJ _{NCV}	1.31E+03	1.37E+03	1.46E+03	1.81E+03	2.18E+03	2.17E+03
SM	kg	1.92E+02	2.07E+02	2.32E+02	2.53E+02	2.37E+02	2.81E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.11E+00	3.10E+00	3.06E+00	3.11E+00	2.89E+00	2.94E+00
HWD	kg	6.56E-06	6.97E-06	7.79E-06	1.76E-05	3.34E-05	0.00E+00
NHWD	kg	3.88E-01	4.09E-01	4.46E-01	1.74E+00	2.79E+00	5.77E-01
RWD	kg	1.14E-03	1.21E-03	1.36E-03	3.29E-03	4.60E-03	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Wollongong region

TABLE 17. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Indicator	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
GWP	kg CO ₂ eq.	333	324	316	422	491	521
ODP	kg CFC11 eq	3.35E-06	3.30E-06	3.26E-06	3.71E-06	3.93E-06	4.07E-06
AP	kg SO ₂ eq	0.495	0.480	0.469	0.604	0.689	0.746
EP	kg PO ₄ ³⁻ eq	0.116	0.113	0.111	0.143	0.164	0.175
POCP	kg C ₂ H ₄ eq	0.0266	0.0259	0.0255	0.0318	0.0360	0.0399
ADPE	kg Sb eq	5.25E-06	3.07E-06	3.07E-06	9.06E-06	1.06E-05	2.68E-05
ADPF	MJ _{NCV}	1960	1910	1870	2470	2840	3120

TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Parameter	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
PERE	MJ _{NCV}	6.53E+01	6.33E+01	6.18E+01	8.58E+01	9.89E+01	1.17E+02
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	8.66E-02	9.62E-02	2.89E-01
PERT	MJ _{NCV}	6.53E+01	6.33E+01	6.18E+01	8.58E+01	9.90E+01	1.17E+02
PENRE	MJ _{NCV}	1.96E+03	1.91E+03	1.87E+03	2.46E+03	2.83E+03	3.11E+03
PENRM	MJ _{NCV}	7.37E+00	8.03E+00	8.13E+00	1.64E+01	2.04E+01	3.36E+01
PENRT	MJ _{NCV}	1.97E+03	1.92E+03	1.87E+03	2.48E+03	2.85E+03	3.14E+03
SM	kg	5.22E+01	5.50E+01	5.57E+01	9.81E+01	5.90E+01	9.96E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.99E+00	2.93E+00	2.92E+00	2.86E+00	2.93E+00	2.90E+00
HWD	kg	1.02E-05	9.70E-06	9.82E-06	2.97E-05	3.54E-05	8.04E-05
NHWD	kg	1.09E+00	3.93E-01	3.85E-01	1.43E+00	1.61E+00	4.90E+00
RWD	kg	1.92E-03	1.66E-03	1.68E-03	3.78E-03	4.62E-03	9.60E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Wollongong region

TABLE 19. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Indicator	Unit	TREMIE 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
GWP	kg CO₂ eq.	305	372	464	368	250	284
ODP	kg CFC11 eq	3.52E-06	3.71E-06	3.94E-06	3.48E-06	3.29E-06	3.34E-06
AP	kg SO ₂ eq	0.489	0.568	0.680	0.532	0.400	0.438
EP	kg PO ₄ ³⁻ eq	0.109	0.129	0.157	0.126	0.0933	0.103
POCP	kg C ₂ H ₄ eq	0.0271	0.0305	0.0363	0.0282	0.0226	0.0243
ADPE	kg Sb eq	2.00E-05	2.04E-05	2.77E-05	3.62E-06	2.82E-06	3.02E-06
ADPF	MJ _{NCV}	1880	2230	2780	2150	1540	1720

TABLE 20. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Parameter	Unit	TREMIE 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
PERE	MJ _{NCV}	6.60E+01	7.89E+01	1.02E+02	7.14E+01	4.95E+01	5.58E+01
PERM	MJ _{NCV}	9.62E-02	1.20E-01	1.92E-01	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	6.61E+01	7.91E+01	1.02E+02	7.14E+01	4.95E+01	5.58E+01
PENRE	MJ _{NCV}	1.87E+03	2.23E+03	2.76E+03	2.14E+03	1.54E+03	1.71E+03
PENRM	MJ _{NCV}	7.13E+00	8.91E+00	2.57E+01	1.08E+01	8.03E+00	8.49E+00
PENRT	MJ _{NCV}	1.88E+03	2.24E+03	2.79E+03	2.16E+03	1.55E+03	1.72E+03
SM	kg	1.35E+02	1.48E+02	1.41E+02	8.57E+01	1.02E+02	8.25E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.98E+00	2.82E+00	2.72E+00	2.82E+00	3.03E+00	3.04E+00
HWD	kg	3.32E-05	3.73E-05	6.54E-05	1.16E-05	9.00E-06	9.63E-06
NHWD	kg	4.99E+00	4.95E+00	5.87E+00	4.41E-01	3.15E-01	3.51E-01
RWD	kg	4.95E-03	5.21E-03	8.95E-03	2.01E-03	1.56E-03	1.66E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Wollongong region

TABLE 21. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Indicator	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 4:1	STABILISED SAND 8:1	THERMAL FTB 45	THERMAL FTB 60
GWP	kg CO ₂ eq.	232	62	309	181	65	77
ODP	kg CFC11 eq	2.63E-06	1.90E-06	2.65E-06	2.16E-06	2.76E-06	2.66E-06
AP	kg SO ₂ eq	0.356	0.148	0.435	0.281	0.181	0.189
EP	kg PO ₄ ³⁻ eq	0.0833	0.0324	0.103	0.0657	0.0391	0.0414
POCP	kg C ₂ H ₄ eq	0.0196	0.00999	0.0223	0.0153	0.0125	0.0127
ADPE	kg Sb eq	8.16E-07	4.91E-07	1.01E-06	7.40E-07	5.37E-07	5.42E-07
ADPF	MJ _{NCV}	1360	522	1760	1090	555	601

TABLE 22. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Parameter	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 4:1	STABILISED SAND 8:1	THERMAL FTB 45	THERMAL FTB 60
PERE	MJ _{NCV}	4.32E+01	1.76E+01	5.99E+01	3.74E+01	1.42E+01	1.61E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.32E+01	1.76E+01	5.99E+01	3.74E+01	1.42E+01	1.61E+01
PENRE	MJ _{NCV}	1.36E+03	5.22E+02	1.76E+03	1.09E+03	5.55E+02	6.01E+02
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.36E+03	5.22E+02	1.76E+03	1.09E+03	5.55E+02	6.01E+02
SM	kg	8.08E+00	6.32E+01	1.10E+01	6.14E+00	1.26E+02	1.11E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.47E+00	2.34E+00	2.37E+00	2.42E+00	3.16E+00	3.01E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	2.44E-01	1.46E-01	3.43E-01	2.22E-01	9.15E-02	1.01E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Wollongong region

TABLE 23. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Indicator	Unit	TfNSW B80 40 MPa PUMP B1 EXPOSURE	TfNSW B80 40 MPa PUMP B2 EXPOSURE	TfNSW B80 40 MPa TREMIE B2 EXPOSURE	TfNSW B80 50 MPa TREMIE CFA C1 EXPOSURE
GWP	kg CO₂ eq.	308	315	324	344
ODP	kg CFC11 eq	3.44E-06	3.55E-06	3.56E-06	3.65E-06
AP	kg SO ₂ eq	0.473	0.483	0.503	0.535
EP	kg PO ₄ ³⁻ eq	0.110	0.113	0.116	0.123
POCP	kg C ₂ H ₄ eq	0.0257	0.0264	0.0279	0.0298
ADPE	kg Sb eq	8.27E-06	6.50E-06	1.51E-05	2.19E-05
ADPF	MJ _{NCV}	1870	1900	2000	2140

TABLE 24. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Parameter	Unit	TfNSW B80 40 MPa PUMP B1 EXPOSURE	TfNSW B80 40 MPa PUMP B2 EXPOSURE	TfNSW B80 40 MPa TREMIE B2 EXPOSURE	TfNSW B80 50 MPa TREMIE CFA C1 EXPOSURE
PERE	MJ _{NCV}	6.32E+01	6.22E+01	6.98E+01	7.86E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	8.46E-02	2.02E-01
PERT	MJ _{NCV}	6.32E+01	6.22E+01	6.99E+01	7.88E+01
PENRE	MJ _{NCV}	1.87E+03	1.90E+03	1.99E+03	2.13E+03
PENRM	MJ _{NCV}	1.11E+01	1.10E+01	1.81E+01	2.28E+01
PENRT	MJ _{NCV}	1.88E+03	1.91E+03	2.01E+03	2.15E+03
SM	kg	1.25E+02	1.30E+02	1.20E+02	1.36E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.02E+00	2.92E+00	3.02E+00	3.01E+00
HWD	kg	1.63E-05	1.45E-05	3.69E-05	5.86E-05
NHWD	kg	1.72E+00	1.22E+00	3.01E+00	4.32E+00
RWD	kg	3.10E-03	2.70E-03	5.40E-03	7.31E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Wollongong region

TABLE 25. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Indicator	Unit	TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND MACHINE / PLACED	TfNSW R83 35 MPa HAND MACHINE / PLACED
GWP	kg CO₂ eq.	402	108	283
ODP	kg CFC11 eq	3.86E-06	2.88E-06	3.45E-06
AP	kg SO ₂ eq	0.591	0.231	0.443
EP	kg PO ₄ ³⁻ eq	0.139	0.051	0.102
POCP	kg C ₂ H ₄ eq	0.0315	0.0148	0.0243
ADPE	kg Sb eq	1.30E-05	3.56E-06	4.06E-06
ADPF	Mj _{NCV}	2410	817	1700

TABLE 26. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Parameter	Unit	TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND MACHINE / PLACED	TfNSW R83 35 MPa HAND MACHINE / PLACED
PERE	Mj _{NCV}	8.31E+01	2.58E+01	5.45E+01
PERM	Mj _{NCV}	2.40E-02	0.00E+00	0.00E+00
PERT	Mj _{NCV}	8.31E+01	2.58E+01	5.45E+01
PENRE	Mj _{NCV}	2.40E+03	8.15E+02	1.70E+03
PENRM	Mj _{NCV}	2.05E+01	4.10E+00	2.19E+00
PENRT	Mj _{NCV}	2.42E+03	8.20E+02	1.70E+03
SM	kg	1.70E+02	1.69E+02	1.14E+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	2.88E+00	3.09E+00	3.05E+00
HWD	kg	3.10E-05	8.49E-06	4.75E-06
NHWD	kg	2.46E+00	6.41E-01	1.04E+00
RWD	kg	5.34E-03	1.50E-03	9.72E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	Mj	0.00E+00	0.00E+00	0.00E+00

Wollongong region

TABLE 27. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Indicator	Unit	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
GWP	kg CO ₂ eq.	253	280	314	356
ODP	kg CFC11 eq	3.15E-06	3.25E-06	3.38E-06	3.54E-06
AP	kg SO ₂ eq	0.407	0.440	0.482	0.535
EP	kg PO ₄ ³⁻ eq	0.0931	0.101	0.111	0.124
POCP	kg C ₂ H ₄ eq	0.0228	0.0243	0.0264	0.0289
ADPE	kg Sb eq	1.17E-05	1.24E-05	1.39E-05	1.57E-05
ADPF	MJ _{NCV}	1590	1730	1920	2150

TABLE 28. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M³

Parameter	Unit	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
PERE	MJ _{NCV}	5.55E+01	6.03E+01	6.72E+01	7.56E+01
PERM	MJ _{NCV}	7.21E-02	7.21E-02	8.42E-02	9.62E-02
PERT	MJ _{NCV}	5.55E+01	6.04E+01	6.73E+01	7.57E+01
PENRE	MJ _{NCV}	1.58E+03	1.72E+03	1.91E+03	2.14E+03
PENRM	MJ _{NCV}	1.15E+01	1.21E+01	1.37E+01	1.55E+01
PENRT	MJ _{NCV}	1.60E+03	1.74E+03	1.92E+03	2.16E+03
SM	kg	1.27E+02	1.32E+02	1.40E+02	1.47E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.84E+00	2.81E+00	2.77E+00	2.71E+00
HWD	kg	2.71E-05	2.82E-05	3.22E-05	3.64E-05
NHWD	kg	2.45E+00	2.60E+00	2.93E+00	3.31E+00
RWD	kg	3.84E-03	4.04E-03	4.57E-03	5.16E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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



Canberra region

Environmental profiles and parameters

Product table list

Canberra region

In each region, we start with presenting a summary of the cradle-to-gate carbon footprint (GWP summary) of our concrete mixes.

Normal class concrete products

Table No. 1 and 2 85

- NORMAL CLASS GP BLEND 20 MP_a
- NORMAL CLASS GP BLEND 25 MP_a
- NORMAL CLASS GP BLEND 32 MP_a
- NORMAL CLASS GP BLEND 40 MP_a
- NORMAL CLASS GP BLEND 50 MP_a

Table No. 3 and 4 86

- NORMAL CLASS GP / FA BLEND 20 MP_a
- NORMAL CLASS GP / FA BLEND 25 MP_a
- NORMAL CLASS GP / FA BLEND 32 MP_a
- NORMAL CLASS GP / FA BLEND 40 MP_a
- NORMAL CLASS GP / FA BLEND 50 MP_a

Table No. 5 and 6 87

- NORMAL CLASS GP / GGBFS BLEND 20 MP_a
- NORMAL CLASS GP / GGBFS BLEND 25 MP_a
- NORMAL CLASS GP / GGBFS BLEND 32 MP_a
- NORMAL CLASS GP / GGBFS BLEND 40 MP_a
- NORMAL CLASS GP / GGBFS BLEND 50 MP_a

Lower carbon concrete products

Table No. 7 and 8 88

- ENVIROCRETE[®] 30% 20 MP_a
- ENVIROCRETE[®] 30% 25 MP_a
- ENVIROCRETE[®] 30% 32 MP_a
- ENVIROCRETE[®] 30% 40 MP_a
- ENVIROCRETE[®] 30% 50 MP_a

Table No. 9 and 10 89

- ENVIROCRETE[®] 40% 20 MP_a
- ENVIROCRETE[®] 40% 25 MP_a
- ENVIROCRETE[®] 40% 32 MP_a
- ENVIROCRETE[®] 40% 40 MP_a
- ENVIROCRETE[®] 40% 50 MP_a

Table No. 11 and 12 90

- ENVIROCRETE[®] PLUS 20 MP_a
- ENVIROCRETE[®] PLUS 25 MP_a
- ENVIROCRETE[®] PLUS 32 MP_a
- ENVIROCRETE[®] PLUS 40 MP_a
- ENVIROCRETE[®] PLUS 50 MP_a

Table No. 13 and 14 91

- ENVISIA[®] 20 MP_a
- ENVISIA[®] 25 MP_a
- ENVISIA[®] 32 MP_a
- ENVISIA[®] 40 MP_a
- ENVISIA[®] 50 MP_a
- ENVISIA[®] 65 MP_a

Concrete for special applications

Table No 15 and 16 92

- POST TENSIONED 40 MP_a 22@3
- POST TENSIONED 40 MP_a 22@4
- POST TENSIONED 40 MP_a 22@5
- HIGH SLUMP 50 MP_a
- HIGH SLUMP 65 MP_a
- HIGH SLUMP 80 MP_a

Table No. 17 and 18 93

- TREMIE 40 MP_a
- TREMIE 50 MP_a
- TREMIE 65 MP_a
- SHOTCRETE 40 MP_a
- KERB MACHINE 25 MP_a
- KERB MACHINE 32 MP_a

Table No. 19 and 20 94

- NO FINES 6:1
- STABILISED SAND 14:1
- STABILISED SAND 8:1
- STABILISED SAND 4:1
- THERMAL FTB 60
- THERMAL FTB 115

Table No. 21 and 22 95

- TfNSW B80 40 MP_a PUMP B1 EXPOSURE
- TfNSW B80 40 MP_a PUMP B2 EXPOSURE
- TfNSW B80 40 MP_a TREMIE B2 EXPOSURE
- TfNSW B80 50 MP_a TREMIE CFA C1 EXPOSURE

Table No. 23 and 24 96

- TfNSW B80 50 MP_a TREMIE B2 EXPOSURE
- TfNSW R82 5 MP_a HAND / MACHINE PLACED
- TfNSW R83 35 MP_a HAND / MACHINE PLACED

Table No. 25 and 26 97

- BLOCKFILL 20MP_a GP/FA BLEND
- BLOCKFILL 25MP_a GP/FA BLEND
- BLOCKFILL32MP_a GP/FA BLEND
- BLOCKFILL40MP_a GP/FA BLEND

Cradle-to-gate GWP-GHG summary (kg CO₂ eq / m³)

Canberra region

NORMAL GP BLEND 20MPa	NORMAL GP BLEND 25MPa	NORMAL GP BLEND 32MPa	NORMAL GP BLEND 40MPa	NORMAL GP BLEND 50MPa	
266	283	309	352	447	
NORMAL GP/FA BLEND 20MPa	NORMAL GP/FA BLEND 25MPa	NORMAL GP/FA BLEND 32MPa	NORMAL GP/FA BLEND 40MPa	NORMAL GP/FA BLEND 50MPa	
207	228	258	331	418	
NORMAL GP/GGBFS BLEND 20MPa	NORMAL GP/GGBFS BLEND 25MPa	NORMAL GP/GGBFS BLEND 32MPa	NORMAL GP/GGBFS BLEND 40MPa	NORMAL GP/GGBFS BLEND 50MPa	
190	202	219	249	314	
ENVIROCRETE® 30% 20MPa	ENVIROCRETE® 30% 25MPa	ENVIROCRETE® 30% 32MPa	ENVIROCRETE® 30% 40MPa	ENVIROCRETE® 30% 50MPa	
207	228	258	311	390	
ENVIROCRETE® 40% 20MPa	ENVIROCRETE® 40% 25MPa	ENVIROCRETE® 40% 32MPa	ENVIROCRETE® 40% 40MPa	ENVIROCRETE® 40% 50MPa	
189	206	236	281	349	
ENVIROCRETE® PLUS 20MPa	ENVIROCRETE® PLUS 25MPa	ENVIROCRETE® PLUS 32MPa	ENVIROCRETE® PLUS 40MPa	ENVIROCRETE® PLUS 50MPa	
182	198	224	268	335	
ENVISIA® 20MPa	ENVISIA® 25MPa	ENVISIA® 32MPa	ENVISIA® 40MPa	ENVISIA® 50MPa	ENVISIA® 65MPa
172	179	192	245	320	325
POST TENSIONED 40MPa 22@3	POST TENSIONED 40MPa 22@4	POST TENSIONED 40MPa 22@5	HIGH SLUMP 50MPa	HIGH SLUMP 65MPa	HIGH SLUMP 80MPa
367	365	366	430	485	512
TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	SHOTCRETE 40MPa 10MM	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
310	382	470	357	255	290
NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1	THERMAL FTB 60	THERMAL FTB 115
233	115	184	313	73	124

Cradle-to-gate GWP-GHG summary (kg CO₂ eq / m³)

Canberra region

TfNSW B80 40MPa 20MM PUMP B1 EXPOSURE	TfNSW B80 40MPa 20MM PUMP B2 EXPOSURE	TfNSW B80 40MPa 20MM TREMIE B2 EXPOSURE	TfNSW B80 50MPa 10MM TREMIE CFA C1 EXPOSURE
315	322	331	352
TfNSW B80 50MPa 20MM TREMIE B2 EXPOSURE	TfNSW R82 5MPa 20MM HAND PLACE	TfNSW R83 35MPa 20MM HAND/ MACHINE PLACE	
409	116	289	
BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
216	233	268	303

Canberra region

TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M³

Indicator	Unit	NORMAL CLASS GP BLEND 20 MPa	NORMAL CLASS GP BLEND 25 MPa	NORMAL CLASS GP BLEND 32 MPa	NORMAL CLASS GP BLEND 40 MPa	NORMAL CLASS GP BLEND 50 MPa
GWP	kg CO ₂ eq.	266	283	309	352	447
ODP	kg CFC11 eq	3.35E-06	3.45E-06	3.48E-06	3.68E-06	4.15E-06
AP	kg SO ₂ eq	0.413	0.435	0.463	0.517	0.635
EP	kg PO ₄ ³⁻ eq	0.0964	0.102	0.109	0.122	0.151
POCP	kg C ₂ H ₄ eq	0.0225	0.0236	0.0248	0.0272	0.0327
ADPE	kg Sb eq	2.17E-06	2.25E-06	2.76E-06	3.13E-06	3.82E-06
ADPF	MJ _{NCV}	1610	1710	1840	2080	2590

TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M³

Parameter	Unit	NORMAL CLASS GP BLEND 20 MPa	NORMAL CLASS GP BLEND 25 MPa	NORMAL CLASS GP BLEND 32 MPa	NORMAL CLASS GP BLEND 40 MPa	NORMAL CLASS GP BLEND 50 MPa
PERE	MJ _{NCV}	4.96E+01	5.27E+01	5.78E+01	6.58E+01	8.32E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.96E+01	5.27E+01	5.78E+01	6.58E+01	8.32E+01
PENRE	MJ _{NCV}	1.61E+03	1.71E+03	1.84E+03	2.07E+03	2.58E+03
PENRM	MJ _{NCV}	3.98E+00	4.17E+00	6.18E+00	7.50E+00	9.56E+00
PENRT	MJ _{NCV}	1.62E+03	1.71E+03	1.85E+03	2.08E+03	2.59E+03
SM	kg	9.04E+00	9.69E+00	1.07E+01	1.23E+01	1.58E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.09E+00	3.10E+00	2.98E+00	2.96E+00	2.92E+00
HWD	kg	4.53E-06	4.74E-06	6.84E-06	8.04E-06	1.03E-05
NHWD	kg	2.90E-01	3.08E-01	3.43E-01	3.90E-01	4.92E-01
RWD	kg	7.81E-04	8.18E-04	1.18E-03	1.40E-03	1.79E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Canberra region

TABLE 3. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M³

Indicator	Unit	NORMAL CLASS GP / FA BLEND 20 MPa	NORMAL CLASS GP / FA BLEND 25 MPa	NORMAL CLASS GP / FA BLEND 32 MPa	NORMAL CLASS GP / FA BLEND 40 MPa	NORMAL CLASS GP / FA BLEND 50 MPa
GWP	kg CO₂ eq.	207	228	258	331	418
ODP	kg CFC11 eq	3.68E-06	3.73E-06	3.78E-06	4.16E-06	4.58E-06
AP	kg SO ₂ eq	0.358	0.382	0.416	0.508	0.616
EP	kg PO ₄ ³⁻ eq	0.0819	0.0879	0.0965	0.119	0.145
POCP	kg C ₂ H ₄ eq	0.0204	0.0215	0.0230	0.0273	0.0323
ADPE	kg Sb eq	2.03E-06	2.12E-06	2.64E-06	3.08E-06	3.75E-06
ADPF	MJ _{NCV}	1340	1450	1610	2010	2470

TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M³

Parameter	Unit	NORMAL CLASS GP / FA BLEND 20 MPa	NORMAL CLASS GP / FA BLEND 25 MPa	NORMAL CLASS GP / FA BLEND 32 MPa	NORMAL CLASS GP / FA BLEND 40 MPa	NORMAL CLASS GP / FA BLEND 50 MPa
PERE	MJ _{NCV}	3.82E+01	4.21E+01	4.80E+01	6.13E+01	7.72E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.82E+01	4.21E+01	4.80E+01	6.13E+01	7.72E+01
PENRE	MJ _{NCV}	1.34E+03	1.45E+03	1.61E+03	2.00E+03	2.47E+03
PENRM	MJ _{NCV}	3.98E+00	4.17E+00	6.18E+00	7.50E+00	9.56E+00
PENRT	MJ _{NCV}	1.35E+03	1.45E+03	1.61E+03	2.01E+03	2.48E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	9.45E+01	9.77E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.07E+00	3.08E+00	2.96E+00	2.96E+00	2.93E+00
HWD	kg	4.53E-06	4.74E-06	6.84E-06	8.04E-06	1.03E-05
NHWD	kg	2.29E-01	2.50E-01	2.90E-01	3.65E-01	4.59E-01
RWD	kg	7.81E-04	8.18E-04	1.18E-03	1.40E-03	1.79E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Canberra region

TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M³

Indicator	Unit	NORMAL CLASS GP / GGBFS BLEND 20 MPa	NORMAL CLASS GP / GGBFS BLEND 25 MPa	NORMAL CLASS GP / GGBFS BLEND 32 MPa	NORMAL CLASS GP / GGBFS BLEND 40 MPa	NORMAL CLASS GP / GGBFS BLEND 50 MPa
GWP	kg CO ₂ eq.	190	202	219	249	314
ODP	kg CFC11 eq	3.39E-06	3.49E-06	3.52E-06	3.73E-06	4.22E-06
AP	kg SO ₂ eq	0.354	0.372	0.394	0.437	0.533
EP	kg PO ₄ ³⁻ eq	0.0765	0.0804	0.0855	0.0950	0.116
POCP	kg C ₂ H ₄ eq	0.0206	0.0214	0.0224	0.0246	0.0293
ADPE	kg Sb eq	2.15E-06	2.23E-06	2.74E-06	3.10E-06	3.79E-06
ADPF	Mj _{NCV}	1350	1430	1530	1720	2130

TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M³

Parameter	Unit	NORMAL CLASS GP / GGBFS BLEND 20 MPa	NORMAL CLASS GP / GGBFS BLEND 25 MPa	NORMAL CLASS GP / GGBFS BLEND 32 MPa	NORMAL CLASS GP / GGBFS BLEND 40 MPa	NORMAL CLASS GP / GGBFS BLEND 50 MPa
PERE	Mj _{NCV}	4.31E+01	4.57E+01	5.01E+01	5.69E+01	7.18E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	4.31E+01	4.57E+01	5.01E+01	5.69E+01	7.18E+01
PENRE	Mj _{NCV}	1.35E+03	1.42E+03	1.53E+03	1.72E+03	2.12E+03
PENRM	Mj _{NCV}	3.98E+00	4.17E+00	6.18E+00	7.50E+00	9.56E+00
PENRT	Mj _{NCV}	1.35E+03	1.43E+03	1.54E+03	1.72E+03	2.13E+03
SM	kg	1.16E+02	1.24E+02	1.37E+02	1.58E+02	2.03E+02
RSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.14E+00	3.16E+00	3.05E+00	3.03E+00	3.03E+00
HWD	kg	4.53E-06	4.74E-06	6.84E-06	8.04E-06	1.03E-05
NHWD	kg	3.15E-01	3.34E-01	3.72E-01	4.23E-01	5.34E-01
RWD	kg	7.81E-04	8.18E-04	1.18E-03	1.40E-03	1.79E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Canberra region

TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M³

Indicator	Unit	ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
GWP	kg CO₂ eq.	207	228	258	311	390
ODP	kg CFC11 eq	3.68E-06	3.73E-06	3.78E-06	4.17E-06	4.59E-06
AP	kg SO ₂ eq	0.358	0.382	0.416	0.493	0.595
EP	kg PO ₄ ³⁻ eq	0.0819	0.0879	0.0965	0.114	0.138
POCP	kg C ₂ H ₄ eq	0.0204	0.0215	0.0230	0.0268	0.0316
ADPE	kg Sb eq	2.03E-06	2.12E-06	2.64E-06	3.11E-06	3.74E-06
ADPF	MJ _{NCV}	1340	1450	1610	1940	2380

TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M³

Parameter	Unit	ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
PERE	MJ _{NCV}	3.82E+01	4.21E+01	4.80E+01	5.96E+01	7.49E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.82E+01	4.21E+01	4.80E+01	5.96E+01	7.49E+01
PENRE	MJ _{NCV}	1.34E+03	1.45E+03	1.61E+03	1.93E+03	2.37E+03
PENRM	MJ _{NCV}	3.98E+00	4.17E+00	6.18E+00	7.50E+00	9.56E+00
PENRT	MJ _{NCV}	1.35E+03	1.45E+03	1.61E+03	1.94E+03	2.38E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	1.23E+02	1.36E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.07E+00	3.08E+00	2.96E+00	2.98E+00	2.95E+00
HWD	kg	4.53E-06	4.74E-06	6.84E-06	8.25E-06	1.03E-05
NHWD	kg	2.29E-01	2.50E-01	2.90E-01	3.73E-01	4.68E-01
RWD	kg	7.81E-04	8.18E-04	1.18E-03	1.43E-03	1.79E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Canberra region

TABLE 9. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M³

Indicator	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
GWP	kg CO ₂ eq.	189	206	236	281	349
ODP	kg CFC11 eq	3.64E-06	3.67E-06	3.86E-06	4.05E-06	4.44E-06
AP	kg SO ₂ eq	0.349	0.367	0.409	0.470	0.566
EP	kg PO ₄ ³⁻ eq	0.0771	0.0817	0.0912	0.105	0.126
POCP	kg C ₂ H ₄ eq	0.0201	0.0209	0.0230	0.0259	0.0308
ADPE	kg Sb eq	3.68E-06	3.84E-06	4.37E-06	7.96E-06	1.26E-05
ADPF	MJ _{NCV}	1290	1380	1550	1820	2240

TABLE 10. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M³

Parameter	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
PERE	MJ _{NCV}	3.80E+01	4.10E+01	4.72E+01	5.83E+01	7.56E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	3.80E+01	4.10E+01	4.72E+01	5.84E+01	7.57E+01
PENRE	MJ _{NCV}	1.29E+03	1.38E+03	1.55E+03	1.82E+03	2.24E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	MJ _{NCV}	1.29E+03	1.38E+03	1.55E+03	1.82E+03	2.25E+03
SM	kg	1.28E+02	1.29E+02	1.30E+02	1.52E+02	1.83E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.06E+00	2.99E+00	3.10E+00	2.92E+00	2.83E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	8.21E-01	8.73E-01	1.02E+00	1.74E+00	2.60E+00
RWD	kg	8.62E-04	8.90E-04	1.01E-03	2.18E-03	3.87E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Canberra region

TABLE 11. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
GWP	kg CO₂ eq.	182	198	224	268	335
ODP	kg CFC11 eq	3.54E-06	3.63E-06	3.72E-06	3.87E-06	4.39E-06
AP	kg SO ₂ eq	0.344	0.366	0.398	0.456	0.558
EP	kg PO ₄ ³⁻ eq	0.0749	0.0798	0.0872	0.100	0.122
POCP	kg C ₂ H ₄ eq	0.0201	0.0211	0.0225	0.0253	0.0306
ADPE	kg Sb eq	3.72E-06	3.88E-06	4.36E-06	7.97E-06	1.26E-05
ADPF	MJ _{NCV}	1280	1370	1510	1770	2210

TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M³

Parameter	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
PERE	MJ _{NCV}	3.89E+01	4.20E+01	4.71E+01	5.81E+01	7.60E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	3.89E+01	4.20E+01	4.71E+01	5.81E+01	7.61E+01
PENRE	MJ _{NCV}	1.28E+03	1.37E+03	1.51E+03	1.77E+03	2.21E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	MJ _{NCV}	1.28E+03	1.37E+03	1.51E+03	1.77E+03	2.22E+03
SM	kg	1.26E+02	1.32E+02	1.38E+02	1.49E+02	2.06E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.14E+00	3.11E+00	3.04E+00	2.93E+00	2.86E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	8.42E-01	8.98E-01	1.03E+00	1.76E+00	2.63E+00
RWD	kg	8.62E-04	8.90E-04	1.01E-03	2.18E-03	3.87E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	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	0.00E+00

Canberra region

TABLE 13. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M³

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
GWP	kg CO₂ eq.	172	179	192	245	320	325
ODP	kg CFC11 eq	3.58E-06	3.67E-06	3.78E-06	3.99E-06	4.27E-06	4.59E-06
AP	kg SO ₂ eq	0.357	0.370	0.393	0.467	0.560	0.571
EP	kg PO ₄ ³⁻ eq	0.0734	0.0759	0.0802	0.0964	0.119	0.121
POCP	kg C ₂ H ₄ eq	0.0212	0.0219	0.0231	0.0268	0.0312	0.0312
ADPE	kg Sb eq	2.67E-06	2.80E-06	3.03E-06	8.64E-06	1.38E-05	1.71E-06
ADPF	MJ _{NCV}	1360	1420	1520	1850	2240	2250

TABLE 14. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M³

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
PERE	MJ _{NCV}	4.53E+01	4.75E+01	5.16E+01	6.49E+01	8.09E+01	7.63E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.14E-02	0.00E+00
PERT	MJ _{NCV}	4.53E+01	4.75E+01	5.16E+01	6.49E+01	8.10E+01	7.63E+01
PENRE	MJ _{NCV}	1.36E+03	1.42E+03	1.51E+03	1.84E+03	2.24E+03	2.25E+03
PENRM	MJ _{NCV}	6.12E+00	6.50E+00	7.27E+00	1.26E+01	1.54E+01	0.00E+00
PENRT	MJ _{NCV}	1.37E+03	1.42E+03	1.52E+03	1.85E+03	2.25E+03	2.25E+03
SM	kg	1.92E+02	2.07E+02	2.32E+02	2.53E+02	2.37E+02	2.81E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.18E+00	3.17E+00	3.13E+00	2.97E+00	2.96E+00	3.01E+00
HWD	kg	6.56E-06	6.97E-06	7.79E-06	1.76E-05	3.34E-05	0.00E+00
NHWD	kg	3.75E-01	3.96E-01	4.35E-01	1.73E+00	2.78E+00	5.66E-01
RWD	kg	1.14E-03	1.21E-03	1.36E-03	3.29E-03	4.60E-03	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Canberra region

TABLE 15. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Indicator	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
GWP	kg CO₂ eq.	367	365	366	430	485	512
ODP	kg CFC11 eq	3.85E-06	3.75E-06	3.79E-06	4.70E-06	4.85E-06	4.93E-06
AP	kg SO ₂ eq	0.546	0.533	0.538	0.638	0.715	0.758
EP	kg PO ₄ ³⁻ eq	0.128	0.126	0.127	0.150	0.167	0.176
POCP	kg C ₂ H ₄ eq	0.0292	0.0280	0.0284	0.0339	0.0378	0.0404
ADPE	kg Sb eq	9.14E-06	3.18E-06	4.72E-06	9.28E-06	1.89E-05	2.29E-05
ADPF	MJ _{NCV}	2220	2140	2160	2580	2920	3140

TABLE 16. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Parameter	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
PERE	MJ _{NCV}	7.55E+01	6.81E+01	6.96E+01	8.36E+01	9.95E+01	1.13E+02
PERM	MJ _{NCV}	9.38E-02	0.00E+00	2.40E-02	8.66E-02	1.68E-01	2.89E-01
PERT	MJ _{NCV}	7.56E+01	6.81E+01	6.96E+01	8.37E+01	9.97E+01	1.13E+02
PENRE	MJ _{NCV}	2.21E+03	2.14E+03	2.16E+03	2.57E+03	2.91E+03	3.12E+03
PENRM	MJ _{NCV}	1.44E+01	7.56E+00	9.34E+00	1.64E+01	2.40E+01	3.32E+01
PENRT	MJ _{NCV}	2.23E+03	2.15E+03	2.17E+03	2.59E+03	2.93E+03	3.16E+03
SM	kg	1.26E+01	1.28E+01	1.28E+01	9.81E+01	1.00E+02	9.86E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.21E+00	2.96E+00	3.01E+00	2.93E+00	2.85E+00	3.03E+00
HWD	kg	2.86E-05	8.11E-06	1.34E-05	2.97E-05	5.29E-05	7.61E-05
NHWD	kg	1.44E+00	4.02E-01	6.64E-01	1.41E+00	3.44E+00	3.72E+00
RWD	kg	3.48E-03	1.41E-03	1.95E-03	3.78E-03	6.73E-03	8.62E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Canberra region

TABLE 17. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Indicator	Unit	TREMIE 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
GWP	kg CO₂ eq.	310	382	470	357	255	290
ODP	kg CFC11 eq	4.42E-06	4.77E-06	4.82E-06	4.35E-06	3.99E-06	4.06E-06
AP	kg SO ₂ eq	0.502	0.593	0.704	0.542	0.421	0.462
EP	kg PO ₄ ³⁻ eq	0.114	0.137	0.163	0.127	0.0970	0.107
POCP	kg C ₂ H ₄ eq	0.0276	0.0320	0.0376	0.0290	0.0236	0.0256
ADPE	kg Sb eq	9.99E-06	1.27E-05	2.36E-05	3.24E-06	2.59E-06	3.51E-06
ADPF	MJ _{NCV}	1940	2350	2860	2150	1620	1810

TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Parameter	Unit	TREMIE 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
PERE	MJ _{NCV}	6.10E+01	7.59E+01	9.88E+01	6.55E+01	4.72E+01	5.45E+01
PERM	MJ _{NCV}	9.62E-02	9.62E-02	1.83E-01	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	6.11E+01	7.60E+01	9.89E+01	6.55E+01	4.72E+01	5.45E+01
PENRE	MJ _{NCV}	1.93E+03	2.34E+03	2.85E+03	2.15E+03	1.61E+03	1.81E+03
PENRM	MJ _{NCV}	7.13E+00	1.53E+01	2.50E+01	8.80E+00	5.74E+00	9.37E+00
PENRT	MJ _{NCV}	1.94E+03	2.36E+03	2.87E+03	2.16E+03	1.62E+03	1.81E+03
SM	kg	1.35E+02	1.53E+02	9.94E+01	9.55E+01	1.02E+02	8.25E+01
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.05E+00	2.91E+00	2.93E+00	2.84E+00	3.07E+00	3.11E+00
HWD	kg	2.35E-05	3.29E-05	5.97E-05	9.44E-06	6.93E-06	1.10E-05
NHWD	kg	2.07E+00	2.36E+00	4.67E+00	3.90E-01	2.87E-01	3.40E-01
RWD	kg	2.70E-03	4.37E-03	7.89E-03	1.64E-03	1.19E-03	1.89E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Canberra region

TABLE 19. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Indicator	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1	THERMAL FTB 60	THERMAL FTB 115
GWP	kg CO ₂ eq.	233	115	184	313	73	124
ODP	kg CFC11 eq	2.55E-06	2.52E-06	2.92E-06	3.57E-06	2.18E-06	2.77E-06
AP	kg SO ₂ eq	0.349	0.218	0.306	0.466	0.152	0.237
EP	kg PO ₄ ³⁻ eq	0.0825	0.0487	0.0699	0.109	0.0336	0.0539
POCP	kg C ₂ H ₄ eq	0.0183	0.0133	0.0174	0.0248	0.00907	0.0138
ADPE	kg Sb eq	1.43E-06	3.43E-07	4.98E-07	7.82E-07	1.11E-06	1.23E-06
ADPF	MJ _{NCV}	1370	790	1160	1840	558	842

TABLE 20. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Parameter	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1	THERMAL FTB 60	THERMAL FTB 115
PERE	MJ _{NCV}	4.42E+01	2.00E+01	3.22E+01	5.50E+01	1.58E+01	2.42E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.42E+01	2.00E+01	3.22E+01	5.50E+01	1.58E+01	2.42E+01
PENRE	MJ _{NCV}	1.37E+03	7.91E+02	1.16E+03	1.84E+03	5.58E+02	8.42E+02
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.37E+03	7.91E+02	1.16E+03	1.84E+03	5.58E+02	8.42E+02
SM	kg	8.08E+00	3.55E+00	6.14E+00	1.10E+01	1.11E+02	1.13E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.50E+00	2.47E+00	2.50E+00	2.45E+00	3.09E+00	2.77E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	2.50E-01	1.08E-01	1.74E-01	2.98E-01	8.78E-02	1.42E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00

Canberra region

TABLE 21. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Indicator	Unit	TfNSW B80 40 MPa PUMP B1 EXPOSURE	TfNSW B80 40 MPa PUMP B2 EXPOSURE	TfNSW B80 40 MPa TREMIE B2 EXPOSURE	TfNSW B80 50 MPa TREMIE CFA C1 EXPOSURE
GWP	kg CO ₂ eq.	315	322	331	352
ODP	kg CFC11 eq	4.37E-06	4.35E-06	4.43E-06	4.66E-06
AP	kg SO ₂ eq	0.506	0.51	0.533	0.569
EP	kg PO ₄ ³⁻ eq	0.116	0.118	0.122	0.129
POCP	kg C ₂ H ₄ eq	0.0277	0.0277	0.0295	0.0317
ADPE	kg Sb eq	8.57E-06	6.85E-06	1.54E-05	2.21E-05
ADPF	MJ _{NCV}	1970	2000	2100	2260

TABLE 22. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Parameter	Unit	TfNSW B80 40 MPa PUMP B1 EXPOSURE	TfNSW B80 40 MPa PUMP B2 EXPOSURE	TfNSW B80 40 MPa TREMIE B2 EXPOSURE	TfNSW B80 50 MPa TREMIE CFA C1 EXPOSURE
PERE	MJ _{NCV}	6.04E+01	6.13E+01	6.82E+01	7.69E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	8.46E-02	2.02E-01
PERT	MJ _{NCV}	6.04E+01	6.13E+01	6.83E+01	7.71E+01
PENRE	MJ _{NCV}	1.96E+03	1.99E+03	2.09E+03	2.25E+03
PENRM	MJ _{NCV}	1.11E+01	1.10E+01	1.81E+01	2.28E+01
PENRT	MJ _{NCV}	1.98E+03	2.00E+03	2.11E+03	2.27E+03
SM	kg	1.25E+02	1.30E+02	1.20E+02	1.36E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.09E+00	2.99E+00	3.10E+00	3.09E+00
HWD	kg	1.63E-05	1.45E-05	3.69E-05	5.86E-05
NHWD	kg	1.69E+00	1.21E+00	2.99E+00	4.30E+00
RWD	kg	3.10E-03	2.70E-03	5.40E-03	7.31E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Canberra region

TABLE 23. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Indicator	Unit	TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND MACHINE / PLACED	TfNSW R83 35 MPa HAND MACHINE / PLACED
GWP	kg CO₂ eq.	409	116	289
ODP	kg CFC11 eq	4.86E-06	3.76E-06	4.19E-06
AP	kg SO ₂ eq	0.628	0.263	0.467
EP	kg PO ₄ ³⁻ eq	0.146	0.0575	0.107
POCP	kg C ₂ H ₄ eq	0.0338	0.0164	0.0255
ADPE	kg Sb eq	1.33E-05	2.10E-06	4.39E-06
ADPF	MJ _{NCV}	2520	896	1790

TABLE 24. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Parameter	Unit	TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND MACHINE / PLACED	TfNSW R83 35 MPa HAND MACHINE / PLACED
PERE	MJ _{NCV}	8.05E+01	2.15E+01	5.32E+01
PERM	MJ _{NCV}	2.40E-02	0.00E+00	0.00E+00
PERT	MJ _{NCV}	8.06E+01	2.15E+01	5.32E+01
PENRE	MJ _{NCV}	2.51E+03	8.95E+02	1.79E+03
PENRM	MJ _{NCV}	2.05E+01	2.19E+00	2.19E+00
PENRT	MJ _{NCV}	2.53E+03	8.97E+02	1.79E+03
SM	kg	1.39E+02	1.69E+02	1.14E+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	3.00E+00	3.19E+00	3.13E+00
HWD	kg	3.10E-05	2.95E-06	4.75E-06
NHWD	kg	2.44E+00	3.11E-01	1.02E+00
RWD	kg	5.34E-03	5.49E-04	9.72E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00

Canberra region

TABLE 25. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Indicator	Unit	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
GWP	kg CO ₂ eq.	216	233	268	303
ODP	kg CFC11 eq	3.98E-06	4.03E-06	4.17E-06	4.30E-06
AP	kg SO ₂ eq	0.384	0.404	0.447	0.490
EP	kg PO ₄ ³⁻ eq	0.0864	0.0914	0.102	0.112
POCP	kg C ₂ H ₄ eq	0.0223	0.0232	0.0252	0.0272
ADPE	kg Sb eq	9.15E-06	9.41E-06	1.07E-05	1.20E-05
ADPF	MJ _{NCV}	1460	1550	1740	1930

TABLE 26. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M³

Parameter	Unit	BLOCKFILL 20MPa GP/FA BLEND	BLOCKFILL 25MPa GP/FA BLEND	BLOCKFILL 32MPa GP/FA BLEND	BLOCKFILL 40MPa GP/FA BLEND
PERE	MJ _{NCV}	4.39E+01	4.71E+01	5.42E+01	6.14E+01
PERM	MJ _{NCV}	7.21E-02	7.21E-02	8.42E-02	9.62E-02
PERT	MJ _{NCV}	4.40E+01	4.72E+01	5.43E+01	6.15E+01
PENRE	MJ _{NCV}	1.45E+03	1.54E+03	1.73E+03	1.92E+03
PENRM	MJ _{NCV}	1.19E+01	1.22E+01	1.39E+01	1.55E+01
PENRT	MJ _{NCV}	1.47E+03	1.55E+03	1.75E+03	1.94E+03
SM	kg	1.42E+02	1.43E+02	1.44E+02	1.45E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.86E+00	2.83E+00	2.78E+00	2.74E+00
HWD	kg	2.49E-05	2.54E-05	2.91E-05	3.28E-05
NHWD	kg	1.64E+00	1.69E+00	1.93E+00	2.17E+00
RWD	kg	3.30E-03	3.40E-03	3.86E-03	4.33E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
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

Other environmental information

Water management

Water is a valuable resource and good quality fresh water is essential to our concrete, construction material and plasterboard operations. We use water in manufacturing, and for dust suppression, cleaning and sanitation. Our quarry and asphalt operations are able to use recycled, brackish and / or process water.

At our larger sites, including quarries, we also capture rainfall or stream flow that is largely used for dust control purposes. We are developing systems that will enable us to collect data on captured rainfall and are developing plans that will underpin an overall improvement in water efficiency.

When developing or purchasing new facilities, our due diligence assessment includes scenario analysis of the quantity and quality of water, assessment of the risks of potential water discharges, and, where relevant, river catchment assessments to ensure sufficient water availability and supply.

Waste and recycling

Throughout Boral's operations, some materials are commonly re-used back into our production processes. Returned concrete is used to make concrete blocks at some plants. This beneficially uses materials that would otherwise require disposal. A large proportion of Boral's recycled and lower carbon products revenue, totalling nine per cent of Boral Limited revenue, is derived from external waste products.

This includes our fly ash and recycling businesses. Opportunities for the re-use of production by-products or waste material continues to grow and are actively being pursued.

Biodiversity management

Protecting the diversity of plant and animal species at and around our operational sites is a core component of our land management efforts. Some examples of the many initiatives to protect biodiversity at our own sites include:

- Collaborating with the **Royal Botanic Garden Sydney NSW** in research on the endangered Illawarra Socketwood population at our Dunmore Quarry in New South Wales.
- Partnering with **Sleepy Burrows Wombat Sanctuary** to capture and relocate wombats found at our Peppertree Quarry in New South Wales.
- Construction of a **bird island habitat** as part of our rehabilitation of wetlands at our Dunmore Quarry in New South Wales.
- Conservation work to provide habitat for the threatened **legless lizard** and **spiny rice-flower** at Deer Park Quarry in Victoria.
- Maintaining **koala fodder plantations** at Narangba and Petrie quarries in Queensland.
- Boral in WA has completed a number of community projects at **Orange Grove Primary School** including a Heritage Garden space, installation of garden pathways and cockatoo nesting boxes.
- 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.

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 per cent 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. The industry Associations representing the Concrete and Cement industries are:

- Cement, Concrete and Aggregates Australia (CCAA).
- Green Building Council of Australia (GBCA)
- Infrastructure Sustainability Council (ISC)
- Concrete Institute of Australia (CIA)
- Australian Pozzolan Association (APozA)
- Business Council of Australia (BCA)
- Cement Industry Federation (CIF)

References

AS 3972

General purpose and blended cements.

AS 3582.1

*Supplementary cementitious materials
Part 1: Fly Ash.*

AS 3582.2

*Supplementary cementitious materials
Part 2: Slag – Ground granulated blast furnace.*

AS 2758.1

*Aggregates and rock for engineering purposes
Part 1: Concrete Aggregates.*

AS 1478.1

*Chemical admixtures for concrete, mortar and grout
Part 1: Admixtures for concrete.*

ACLCA 2019

American Center for Life Cycle Assessment (ACLCA),
*ACLCA Guidance to Calculating Non-LCIA Inventory
Metrics in Accordance with ISO 21930:2017*, PCR
Committee, May 2019.

CEN 2013

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

CEN 2017

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.

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 Retarders, IBU EPD Declaration number
EPD-EFC-20150088-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 2015c

EPD of Air entrainers, IBU EPD Declaration
number EPD-EFC-20150086-IAG1-EN, issued
14-09-2015, based on EN 15804 and PCR for
concrete admixtures; EPD owner: EFCA – European
Federation of Concrete Admixtures Associations.

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

PCR 2012:01-Sub-PCR-G, *Product category rules
Concrete and concrete elements*, 18 September 2020.

ISO 2006a

ISO 14040:2006, *Environmental management
– Life cycle assessment – Principles and framework*,
International Organization for Standardization,
Geneva, Switzerland, 2006.

ISO 2006b

ISO14044:2006, *Environmental management –
Life cycle assessment – Requirements and guidelines*,
International Organization for Standardization,
Geneva, Switzerland, 2006.

ISO 2006c

ISO14025:2006, *Environmental labels
and declarations – Type III environmental
declarations – Principles and procedures*,
International Organization for Standardization,
Geneva. Switzerland, 2006.

SA 2007

AS 1379:2007, *Specification and supply of concrete*,
prepared by Committee BD-049 Manufacture of
Concrete, published on 20 September 2007 (and
reconfirmed in 2017) by Standards Australia, Sydney.

TfNSW/RMS

R82 QA *Specification Lean Mix Concrete Sub-base*
2021, R83 QA *Specification Concrete Pavement Base*
2021, B80 *Concrete Work for Bridges* 2021.



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