



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 1.3)

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





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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).

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.

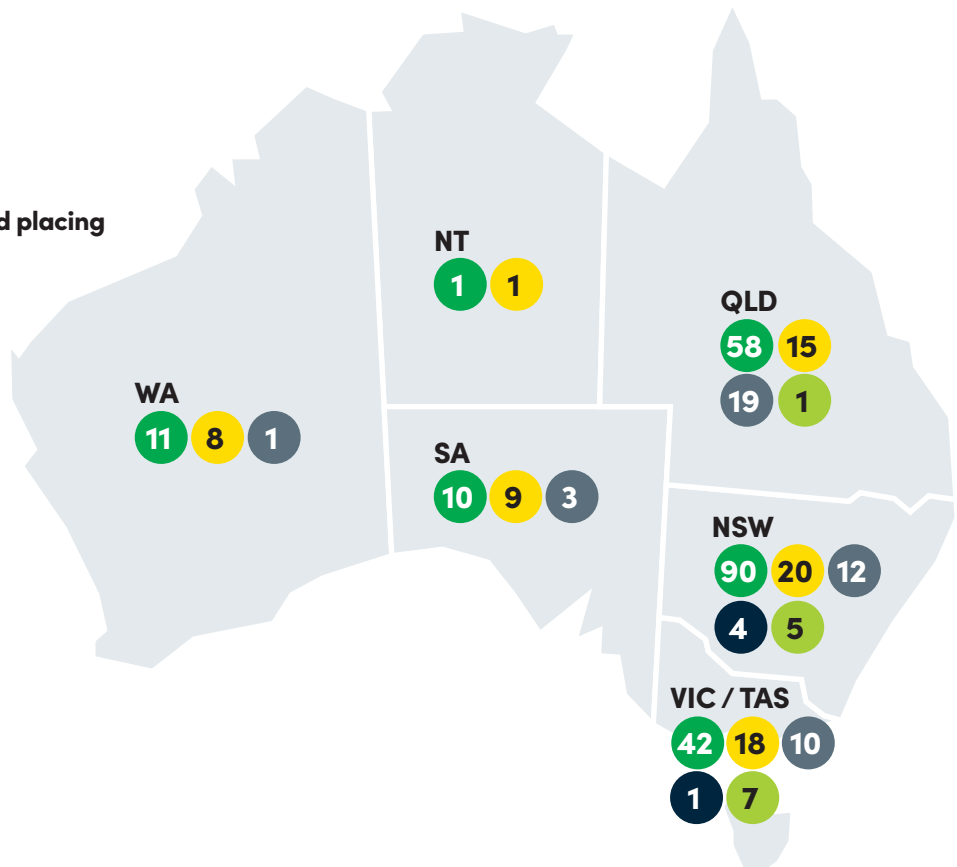
Construction materials Leading integrated network

346

Operating sites*

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

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



About Boral

ZERO HARM
TODAY

How we work

At Boral, we have a culture of ‘working together’ with a focus on Zero Harm Today.

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.



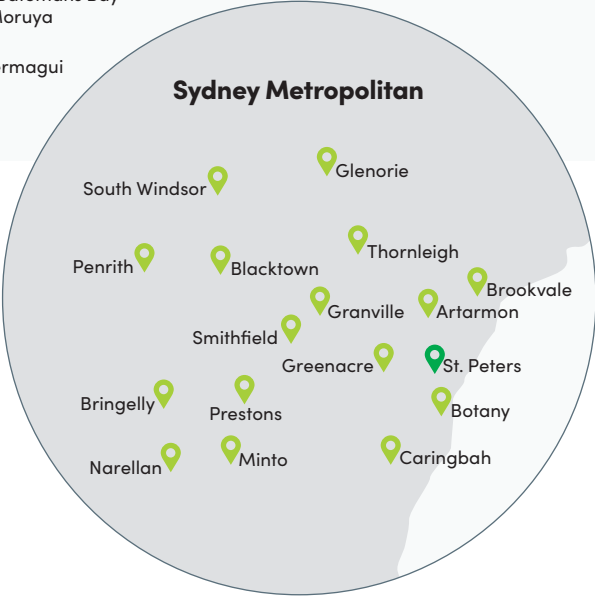
Geographical scope

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



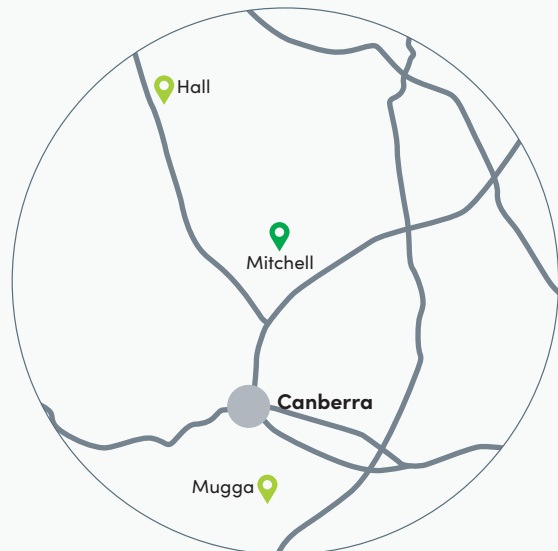
Boral Concrete St Peters
– Sydney, NSW



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) Lower carbon concrete products

- 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
- 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
- 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
- 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

2) Lower carbon concrete products for special applications

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

3) Concrete products for special applications

- 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
- TREMIE 40 MPa
- TREMIE 50 MPa
- TREMIE 65 MPa
- SHOTCRETE 40MPa
- KERB MACHINE 25MPa
- KERB MACHINE 32MPa
- NO FINES 6:1
- STABILISED SAND 14:1
- STABILISED SAND 4:1
- STABILISED SAND 8:1
- 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
- TfNSW B80 50 MPa PUMP B2 EXPOSURE
- TfNSW B80 50 MPa TREMIE B2 EXPOSURE
- TfNSW R82 5 MPa HAND / MACHINE PLACED
- TfNSW R83 35 MPa HAND / MACHINE PLACED
- THERMAL FTB 45
- THERMAL FTB 60
- ASPIRE® 40 GPa / 65 MPa HIGH EARLY
- ASPIRE® 40 GPa / 65 MPa
- ASPIRE® 42 GPa / 50 MPa
- ASPIRE® 45 GPa / 80 MPa LOW HEAT
- ASPIRE® 45 GPa / 80 MPa LATE AGE LOW HEAT
- ASPIRE® 45 GPa / 80 MPa HIGH EARLY
- ASPIRE® 45 GPa / 80 MPa
- ASPIRE® 46 GPa / 65 MPa
- ASPIRE® 47 GPa / 80 MPa
- ASPIRE® 50 GPa / 100 MPa LOW HEAT
- ASPIRE® 50 GPa / 100 MPa LATE AGE LOW HEAT
- ASPIRE® 50 GPa / 100 MPa HIGH EARLY
- ASPIRE® 50 GPa / 100 MPa
- HIGH STRENGTH 100 MPa @90 DAYS
- HIGH STRENGTH 120 MPa @90 DAYS
- LOW HEAT S65 SWC
- LOW HEAT S80 SWC
- LOW HEAT S100@90D SWC
- TfNSW LCC B80 40 MPa B1 EXPOSURE
- TfNSW LCC B80 40 MPa B2 EXPOSURE
- TfNSW LCC B80 50 MPa B1 EXPOSURE

- TfNSW LCC B80 50 MPa B2 EXPOSURE
- TfNSW LCC B80 60 MPa B2 / C1 EXPOSURE
- TfNSW LCC B80 65 MPa B2 / C1 EXPOSURE
- ENVISIA® 50 MPa PRECAST TUNNEL SEGMENTS
- SPECIAL 65 MPa PRECAST TUNNEL SEGMENTS
- SPECIAL 65 MPa PRECAST TUNNEL SEGMENTS (30% SCM)

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.

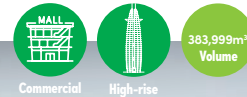


ENVISIA® Case study



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:

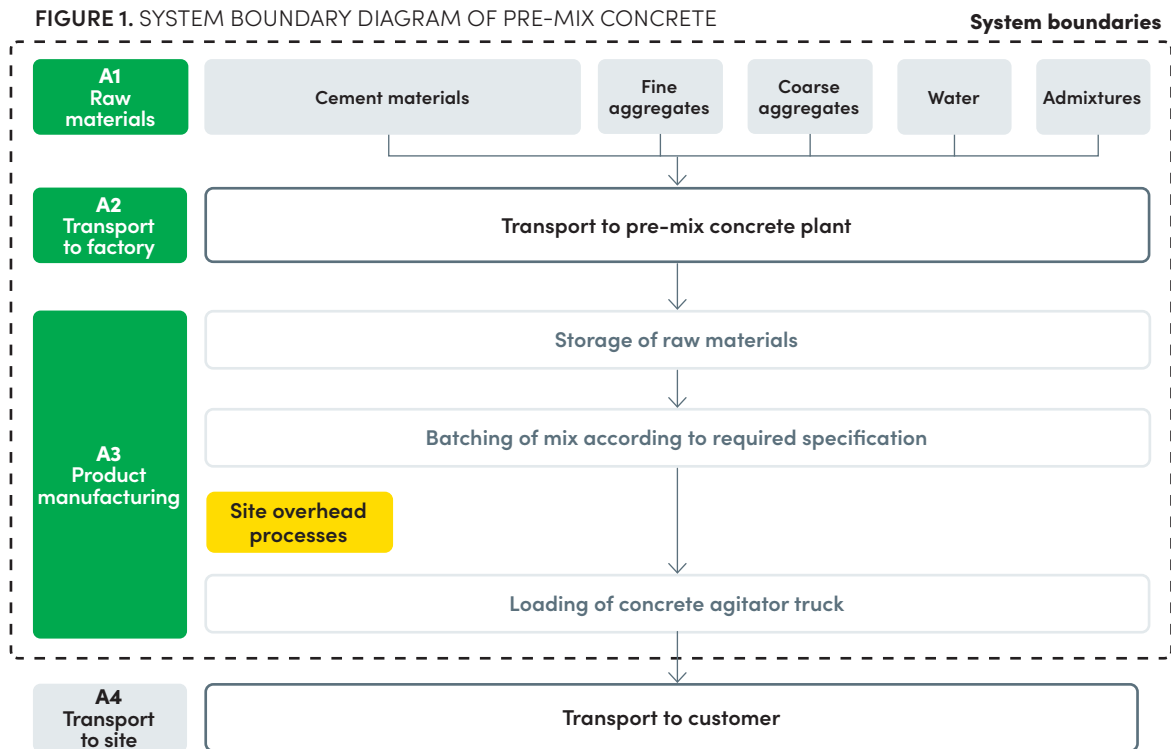
- **Boral supplied a 383,000m³ total concrete volume** across Barangaroo South.
- **Boral supplied ENVISIA® lower carbon concrete¹ and Green Star 3² customised concrete mixes** to support world leading sustainable targets.
- **Boral's purpose built on-site concrete batch plant which:**
 - substantially 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	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.

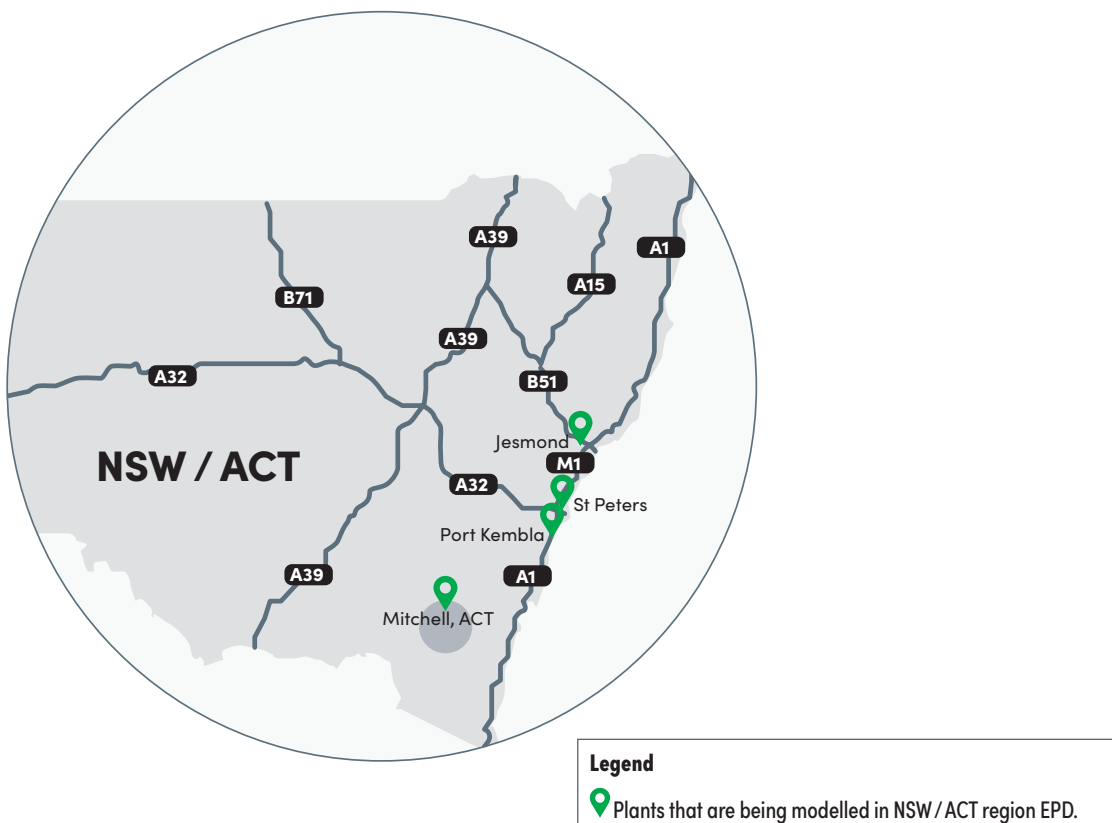
Methodological choices have been applied in line with EN 15804 (CEN 2013); deviations have been recorded.

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 GWP-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%
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.

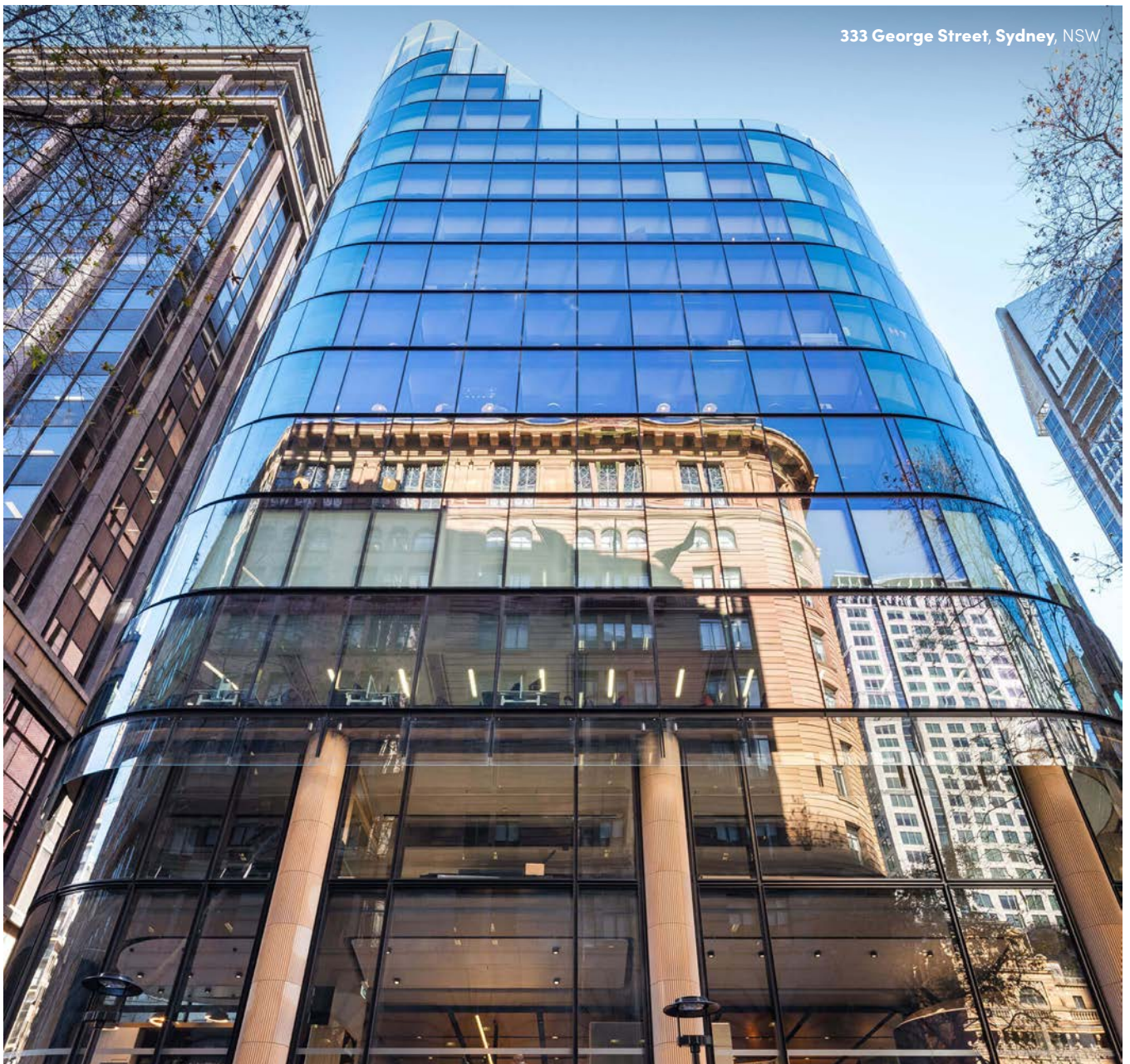
Declared unit

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 228

- 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 429

- 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 30

- 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 831

- 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 10 32

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

Table No. 11 and 1233

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

Table No. 13 and 1434

- 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

Table No. 15 and 1635

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

Concrete for special applications

Table No 17 and 1836

- 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 20 37

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

Table No. 21 and 2238

- NO FINES 6:1
- STABILISED SAND 14:1
- STABILISED SAND 8:1
- STABILISED SAND 4:1

Table No. 23 and 2439

- 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 26 40

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

Table No. 27 and 2841

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

Table No. 29 and 3042

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

Table No. 31 and 3243

- THERMAL FTB 45
- THERMAL FTB 60

Table No. 33 and 34 44

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

Table No. 35 and 3645

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

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		
271	288	314	357	454		
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		
209	230	260	333	421		
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		
192	204	221	250	316		
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		
159	175	207	246	378		
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa		
209	230	260	312	393		
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa		
191	209	238	282	348		
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
191	207	223	262	319	356	383
ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa	ENVISIA® 80 MPa
172	180	188	234	305	343	373
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	
342	335	325	328	379	385	
TREMIE 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa	
258	335	379	309	252	287	

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

Sydney region

NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1				
250	60	94	172				
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 C1 EXPOSURE				
313	231	235	248				
TfNSW LCC B80 40 MPa B1 EXPOSURE	TfNSW LCC B80 40 MPa B2 EXPOSURE	TfNSW LCC B80 50 MPa B1 EXPOSURE	TFNSW LCC B80 50 MPa B2 EXPOSURE	TFNSW LCC B80 60 MPa B2 / C1 EXPOSURE	TFNSW LCC B80 65 MPa B2 / C1 EXPOSURE		
279	210	257	222	237	246		
LOW HEAT S65 SWC	LOW HEAT S80 SWC	LOW HEAT S100@ 90D SWC	ENVISIA® 50 MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65 MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65 MPa PRECAST TUNNEL SEGMENTS (30% SCM)		
259	281	323	267	290	273		
TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW B80 50 MPa TREMIE B2 EXPOSURE	TfNSW R82 5 MPa HAND / MACHINE PLACED	TfNSW R83 35 MPa HAND / MACHINE PLACED				
239	233	116	289				
THERMAL FTB 45	THERMAL FTB 60						
64	76						
ASPIRE® 40 GPa / 65 MPa HIGH EARLY	ASPIRE® 40 GPa / 65 MPa	ASPIRE® 42 GPa / 50 MPa	ASPIRE® 45 GPa / 80 MPa HIGH EARLY	ASPIRE® 45 GPa / 80 MPa	ASPIRE® 45 GPa / 80 MPa LOW HEAT	ASPIRE® 45 GPa / 80 MPa LATE AGE / LOW HEAT	
414	366	375	447	381	380	387	
ASPIRE® 46 GPa / 65 MPa	ASPIRE® 47 GPa / 80MPa	ASPIRE® 50 GPa / 100 MPa HIGH EARLY	ASPIRE® 50 GPa / 100 MPa	ASPIRE® 50 GPa / 100 MPa LOW HEAT	ASPIRE® 50 GPa / 100 MPa LATE AGE LOW HEAT	HIGH STRENGTH 100 MPa @ 90 days	HIGH STRENGTH 120 MPa @ 90 days
381	384	454	383	383	402	428	449

Sydney region

TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (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 CO₂ eq.	271	288	314	357	454
ODP	kg CFC11 eq	2.51E-06	2.55E-06	2.59E-06	2.68E-06	2.91E-06
AP	kg SO ₂ eq	0.417	0.436	0.465	0.515	0.635
EP	kg PO ₄ ³⁻ eq	0.102	0.106	0.114	0.126	0.155
POCP	kg C ₂ H ₄ eq	0.0297	0.0307	0.0321	0.0346	0.0409
ADPE	kg Sb eq	2.34E-06	2.48E-06	2.77E-06	3.15E-06	8.00E-06
ADPF	MJ _{NCV}	1630	1720	1860	2080	2620

TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (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
PERE	MJ _{NCV}	4.02E+01	4.25E+01	4.59E+01	5.15E+01	6.61E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.02E+01	4.25E+01	4.59E+01	5.15E+01	6.61E+01
PENRE	MJ _{NCV}	1.66E+03	1.76E+03	1.89E+03	2.12E+03	2.66E+03
PENRM	MJ _{NCV}	6.23E+00	6.72E+00	7.76E+00	9.07E+00	1.51E+01
PENRT	MJ _{NCV}	1.67E+03	1.76E+03	1.90E+03	2.13E+03	2.67E+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	3.22E+00	3.19E+00	3.12E+00	3.07E+00	3.02E+00
HWD	kg	6.68E-06	7.21E-06	8.32E-06	9.73E-06	1.93E-05
NHWD	kg	4.29E-01	4.50E-01	4.83E-01	5.37E-01	1.60E+00
RWD	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 3. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (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 CO₂ eq.	209	230	260	333	421
ODP	kg CFC11 eq	2.57E-06	2.59E-06	2.64E-06	2.81E-06	3.02E-06
AP	kg SO ₂ eq	0.349	0.373	0.407	0.492	0.602
EP	kg PO ₄ ³⁻ eq	0.0844	0.0904	0.0990	0.120	0.147
POCP	kg C ₂ H ₄ eq	0.0278	0.0288	0.0305	0.0348	0.0405
ADPE	kg Sb eq	2.20E-06	2.36E-06	2.65E-06	3.10E-06	7.93E-06
ADPF	MJ _{NCV}	1320	1430	1590	1970	2460

TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (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
PERE	MJ _{NCV}	3.23E+01	3.50E+01	3.90E+01	4.83E+01	6.19E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.23E+01	3.50E+01	3.90E+01	4.83E+01	6.19E+01
PENRE	MJ _{NCV}	1.35E+03	1.46E+03	1.62E+03	2.01E+03	2.50E+03
PENRM	MJ _{NCV}	6.23E+00	6.72E+00	7.76E+00	9.07E+00	1.51E+01
PENRT	MJ _{NCV}	1.36E+03	1.47E+03	1.63E+03	2.02E+03	2.52E+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	3.19E+00	3.17E+00	3.10E+00	3.06E+00	3.01E+00
HWD	kg	6.68E-06	7.21E-06	8.32E-06	9.73E-06	1.93E-05
NHWD	kg	3.56E-01	3.82E-01	4.20E-01	5.08E-01	1.56E+00
RWD	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

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TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (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.	192	204	221	250	316
ODP	kg CFC11 eq	2.57E-06	2.61E-06	2.66E-06	2.75E-06	3.00E-06
AP	kg SO ₂ eq	0.337	0.351	0.371	0.407	0.495
EP	kg PO ₄ ³⁻ eq	0.0805	0.0839	0.0890	0.0977	0.118
POCP	kg C ₂ H ₄ eq	0.0277	0.0286	0.0298	0.0319	0.0374
ADPE	kg Sb eq	2.25E-06	2.38E-06	2.66E-06	3.03E-06	7.84E-06
ADPF	MJ _{NCV}	1330	1400	1500	1670	2090

TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (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
PERE	MJ _{NCV}	3.30E+01	3.47E+01	3.73E+01	4.17E+01	5.35E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.30E+01	3.47E+01	3.73E+01	4.17E+01	5.35E+01
PENRE	MJ _{NCV}	1.36E+03	1.43E+03	1.53E+03	1.70E+03	2.12E+03
PENRM	MJ _{NCV}	6.23E+00	6.72E+00	7.76E+00	9.07E+00	1.51E+01
PENRT	MJ _{NCV}	1.36E+03	1.43E+03	1.54E+03	1.71E+03	2.14E+03
SM	kg	2.29E+02	2.45E+02	2.70E+02	3.11E+02	4.01E+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	3.21E+00	3.19E+00	3.12E+00	3.07E+00	3.02E+00
HWD	kg	6.68E-06	7.21E-06	8.32E-06	9.73E-06	1.93E-05
NHWD	kg	4.43E-01	4.65E-01	5.00E-01	5.56E-01	1.62E+00
RWD	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

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TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (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.	159	175	207	246	378
ODP	kg CFC11 eq	2.60E-06	2.65E-06	2.74E-06	2.87E-06	2.99E-06
AP	kg SO ₂ eq	0.298	0.317	0.356	0.403	0.556
EP	kg PO ₄ ³⁻ eq	0.0712	0.0758	0.0854	0.0970	0.135
POCP	kg C ₂ H ₄ eq	0.0265	0.0275	0.0297	0.0324	0.0389
ADPE	kg Sb eq	2.14E-06	2.28E-06	2.59E-06	2.98E-06	7.86E-06
ADPF	MJ _{NCV}	1130	1210	1400	1620	2280

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

Indicator	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}	2.75E+01	2.97E+01	3.43E+01	3.98E+01	5.76E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.75E+01	2.97E+01	3.43E+01	3.98E+01	5.76E+01
PENRE	MJ _{NCV}	1.15E+03	1.24E+03	1.43E+03	1.65E+03	2.32E+03
PENRM	MJ _{NCV}	6.23E+00	6.72E+00	7.76E+00	9.07E+00	1.51E+01
PENRT	MJ _{NCV}	1.16E+03	1.25E+03	1.44E+03	1.66E+03	2.33E+03
SM	kg	2.26E+02	2.41E+02	2.72E+02	3.09E+02	1.78E+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	3.18E+00	3.16E+00	3.10E+00	3.06E+00	3.01E+00
HWD	kg	6.68E-06	7.21E-06	8.32E-06	9.73E-06	1.93E-05
NHWD	kg	3.55E-01	3.81E-01	4.35E-01	5.01E-01	1.55E+00
RWD	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

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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 CO ₂ eq.	209	230	260	312	393
ODP	kg CFC11 eq	2.57E-06	2.59E-06	2.64E-06	2.83E-06	3.04E-06
AP	kg SO ₂ eq	0.349	0.373	0.407	0.471	0.573
EP	kg PO ₄ ³⁻ eq	0.0844	0.0904	0.0990	0.115	0.139
POCP	kg C ₂ H ₄ eq	0.0278	0.0288	0.0305	0.0342	0.0398
ADPE	kg Sb eq	2.20E-06	2.36E-06	2.65E-06	3.08E-06	7.89E-06
ADPF	MJ _{NCV}	1320	1430	1590	1890	2350

TABLE 10. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.23E+01	3.50E+01	3.90E+01	4.64E+01	5.93E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.23E+01	3.50E+01	3.90E+01	4.64E+01	5.93E+01
PENRE	MJ _{NCV}	1.35E+03	1.46E+03	1.62E+03	1.92E+03	2.39E+03
PENRM	MJ _{NCV}	6.23E+00	6.72E+00	7.76E+00	9.07E+00	1.51E+01
PENRT	MJ _{NCV}	1.36E+03	1.47E+03	1.63E+03	1.93E+03	2.41E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	1.53E+02	1.76E+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	3.19E+00	3.17E+00	3.10E+00	3.06E+00	3.01E+00
HWD	kg	6.68E-06	7.21E-06	8.32E-06	9.73E-06	1.93E-05
NHWD	kg	3.56E-01	3.82E-01	4.20E-01	5.12E-01	1.57E+00
RWD	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

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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.	191	209	238	282	348
ODP	kg CFC11 eq	2.57E-06	2.60E-06	2.69E-06	2.83E-06	3.00E-06
AP	kg SO ₂ eq	0.334	0.354	0.391	0.445	0.525
EP	kg PO ₄ ³⁻ eq	0.0797	0.0846	0.0937	0.107	0.127
POCP	kg C ₂ H ₄ eq	0.0275	0.0285	0.0305	0.0335	0.0381
ADPE	kg Sb eq	4.13E-06	4.38E-06	4.91E-06	5.78E-06	8.19E-06
ADPF	MJ _{NCV}	1270	1360	1530	1780	2170

TABLE 12. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.16E+01	3.39E+01	3.81E+01	4.43E+01	5.49E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.16E+01	3.39E+01	3.81E+01	4.43E+01	5.49E+01
PENRE	MJ _{NCV}	1.30E+03	1.39E+03	1.56E+03	1.81E+03	2.20E+03
PENRM	MJ _{NCV}	6.31E+00	6.73E+00	7.57E+00	9.05E+00	1.57E+01
PENRT	MJ _{NCV}	1.31E+03	1.40E+03	1.57E+03	1.82E+03	2.22E+03
SM	kg	1.69E+02	1.69E+02	1.80E+02	2.12E+02	2.74E+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	3.13E+00	3.11E+00	3.16E+00	3.09E+00	2.94E+00
HWD	kg	8.57E-06	9.15E-06	1.03E-05	1.23E-05	2.01E-05
NHWD	kg	9.16E-01	9.73E-01	1.09E+00	1.28E+00	1.63E+00
RWD	kg	1.60E-03	1.71E-03	1.92E-03	2.30E-03	3.70E-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

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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.	191	207	223	262	319	356	383
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	0.336	0.355	0.375	0.424	0.503	0.561	0.593
EP	kg PO ₄ ³⁻ eq	0.0776	0.0824	0.0871	0.0982	0.116	0.129	0.136
POCP	kg C ₂ H ₄ eq	0.0242	0.0252	0.0263	0.0288	0.0338	0.0381	0.0393
ADPE	kg Sb eq	4.24E-06	4.50E-06	3.82E-06	5.05E-06	7.01E-06	1.58E-05	1.39E-05
ADPF	MJ _{NCV}	1330	1420	1500	1710	2070	2400	2500

TABLE 14. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.54E+01	3.77E+01	3.94E+01	4.50E+01	5.50E+01	6.83E+01	6.91E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	2.89E-02	4.81E-02	6.73E-02	6.73E-02
PERT	MJ _{NCV}	3.54E+01	3.77E+01	3.94E+01	4.50E+01	5.50E+01	6.84E+01	6.92E+01
PENRE	MJ _{NCV}	1.34E+03	1.43E+03	1.51E+03	1.72E+03	2.09E+03	2.41E+03	2.52E+03
PENRM	MJ _{NCV}	6.31E+00	6.73E+00	5.13E+00	2.77E+00	4.36E+00	2.86E+01	1.81E+01
PENRT	MJ _{NCV}	1.34E+03	1.43E+03	1.52E+03	1.72E+03	2.09E+03	2.44E+03	2.53E+03
SM	kg	1.40E+02	1.45E+02	1.55E+02	1.67E+02	2.28E+02	2.64E+02	2.70E+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	3.27E+00	3.26E+00	3.25E+00	3.19E+00	3.11E+00	3.08E+00	3.04E+00
HWD	kg	8.57E-06	9.15E-06	7.09E-06	8.91E-06	1.38E-05	4.47E-05	3.38E-05
NHWD	kg	1.02E+00	1.08E+00	9.97E-01	1.43E+00	1.91E+00	2.96E+00	3.04E+00
RWD	kg	1.60E-03	1.71E-03	1.33E-03	1.20E-03	1.78E-03	6.97E-03	5.09E-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

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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 CO₂ eq.	172	180	188	234	305	343	373
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	0.338	0.357	0.347	0.411	0.496	0.567	0.607
EP	kg PO ₄ ³⁻ eq	0.0739	0.0766	0.0781	0.0923	0.1129	0.1281	0.1376
POCP	kg C ₂ H ₄ eq	0.0248	0.0261	0.0256	0.0296	0.0340	0.0395	0.0419
ADPE	kg Sb eq	2.71E-06	7.24E-06	3.26E-06	7.43E-06	9.08E-06	2.58E-05	3.10E-05
ADPF	MJ _{NCV}	1300	1380	1380	1670	2050	2450	2650

TABLE 16. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.57E+01	3.88E+01	3.67E+01	4.60E+01	5.60E+01	7.67E+01	8.38E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.37E-02	4.33E-02	1.86E-01	1.97E-01
PERT	MJ _{NCV}	3.57E+01	3.88E+01	3.67E+01	4.60E+01	5.60E+01	7.69E+01	8.40E+01
PENRE	MJ _{NCV}	1.31E+03	1.38E+03	1.38E+03	1.68E+03	2.07E+03	2.45E+03	2.64E+03
PENRM	MJ _{NCV}	7.82E+00	9.03E+00	5.26E+00	8.96E+00	1.10E+01	4.47E+01	5.42E+01
PENRT	MJ _{NCV}	1.32E+03	1.39E+03	1.39E+03	1.69E+03	2.08E+03	2.50E+03	2.70E+03
SM	kg	1.92E+02	2.07E+02	2.03E+02	2.39E+02	2.52E+02	2.92E+02	2.93E+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	3.38E+00	3.34E+00	3.28E+00	3.21E+00	3.13E+00	3.14E+00	3.16E+00
HWD	kg	8.39E-06	1.37E-05	6.70E-06	1.69E-05	2.10E-05	7.92E-05	9.33E-05
NHWD	kg	5.19E-01	1.74E+00	8.46E-01	1.76E+00	2.12E+00	4.49E+00	5.39E+00
RWD	kg	1.46E-03	2.62E-03	1.23E-03	2.56E-03	3.15E-03	1.11E-02	1.35E-02
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 CO ₂ eq.	342	335	325	328	379	385
ODP	kg CFC11 eq	2.78E-06	2.73E-06	2.74E-06	2.95E-06	3.10E-06	3.17E-06
AP	kg SO ₂ eq	0.511	0.503	0.491	0.505	0.571	0.581
EP	kg PO ₄ ³⁻ eq	0.123	0.121	0.118	0.120	0.136	0.140
POCP	kg C ₂ H ₄ eq	0.0353	0.0350	0.0343	0.0370	0.0413	0.0425
ADPE	kg Sb eq	8.12E-06	1.01E-05	7.91E-06	1.10E-05	1.63E-05	1.69E-05
ADPF	MJ _{NCV}	1980	1950	1890	1980	2320	2410

TABLE 18. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	5.12E+01	5.14E+01	4.90E+01	5.22E+01	6.36E+01	6.79E+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}	5.12E+01	5.14E+01	4.90E+01	5.22E+01	6.37E+01	6.80E+01
PENRE	MJ _{NCV}	2.07E+03	2.04E+03	1.98E+03	2.07E+03	2.41E+03	2.49E+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}	2.08E+03	2.05E+03	1.99E+03	2.08E+03	2.43E+03	2.53E+03
SM	kg	5.32E+01	5.29E+01	5.15E+01	2.69E+02	3.16E+02	3.30E+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	3.14E+00	3.15E+00	3.18E+00	2.99E+00	2.89E+00	3.10E+00
HWD	kg	1.38E-05	1.95E-05	1.35E-05	1.96E-05	3.91E-05	5.21E-05
NHWD	kg	1.97E+00	2.27E+00	1.91E+00	2.78E+00	3.39E+00	2.85E+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 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
GWP	kg CO ₂ eq.	258	335	379	309	252	287
ODP	kg CFC11 eq	2.87E-06	3.02E-06	3.13E-06	2.84E-06	2.64E-06	2.69E-06
AP	kg SO ₂ eq	0.447	0.534	0.587	0.477	0.398	0.440
EP	kg PO ₄ ³⁻ eq	0.101	0.123	0.136	0.115	0.096	0.106
POCP	kg C ₂ H ₄ eq	0.0354	0.0395	0.0423	0.0353	0.0299	0.0321
ADPE	kg Sb eq	2.49E-05	2.41E-05	2.58E-05	1.18E-05	1.79E-06	2.35E-06
ADPF	MJ _{NCV}	1700	2090	2330	1860	1460	1650

TABLE 20. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (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
PERE	MJ _{NCV}	5.05E+01	6.02E+01	6.60E+01	4.98E+01	3.59E+01	4.14E+01
PERM	MJ _{NCV}	9.62E-02	1.11E-01	1.01E-01	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.06E+01	6.03E+01	6.61E+01	4.98E+01	3.59E+01	4.14E+01
PENRE	MJ _{NCV}	1.79E+03	2.18E+03	2.42E+03	1.94E+03	1.55E+03	1.75E+03
PENRM	MJ _{NCV}	1.26E+01	1.39E+01	1.40E+01	1.97E+01	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.80E+03	2.20E+03	2.44E+03	1.96E+03	1.55E+03	1.75E+03
SM	kg	3.15E+02	2.99E+02	3.16E+02	1.51E+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
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.10E+00	3.01E+00	2.91E+00	3.02E+00	3.11E+00	3.11E+00
HWD	kg	4.26E-05	4.42E-05	4.49E-05	2.71E-05	9.03E-07	4.07E-06
NHWD	kg	6.24E+00	5.94E+00	6.43E+00	2.34E+00	6.38E-01	7.05E-01
RWD	kg	6.82E-03	6.76E-03	7.13E-03	5.08E-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
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

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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 8:1	STABILISED SAND 4:1
GWP	kg CO₂ eq.	250	60	94	172
ODP	kg CFC11 eq	2.31E-06	1.64E-06	1.84E-06	2.32E-06
AP	kg SO ₂ eq	0.381	0.144	0.190	0.297
EP	kg PO ₄ ³⁻ eq	0.092	0.033	0.044	0.069
POCP	kg C ₂ H ₄ eq	0.0271	0.0152	0.0185	0.0259
ADPE	kg Sb eq	8.66E-07	1.55E-07	2.58E-07	4.98E-07
ADPF	MJ _{NCV}	1430	440	650	1160

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

Indicator	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1
PERE	MJ _{NCV}	3.57E+01	1.05E+01	1.57E+01	2.79E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.57E+01	1.05E+01	1.57E+01	2.79E+01
PENRE	MJ _{NCV}	1.52E+03	5.10E+02	7.32E+02	1.25E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.52E+03	5.10E+02	7.32E+02	1.25E+03
SM	kg	8.40E+00	1.25E+02	2.18E+02	4.36E+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	2.67E+00	2.48E+00	2.50E+00	2.55E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	3.71E-01	1.53E-01	2.34E-01	4.22E-01
RWD	kg	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
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

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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.	313	231	235	248
ODP	kg CFC11 eq	2.85E-06	2.95E-06	2.94E-06	3.00E-06
AP	kg SO ₂ eq	0.480	0.396	0.411	0.434
EP	kg PO ₄ ³⁻ eq	0.116	0.094	0.096	0.100
POCP	kg C ₂ H ₄ eq	0.0349	0.0332	0.0343	0.0362
ADPE	kg Sb eq	8.17E-06	6.34E-06	1.50E-05	2.17E-05
ADPF	MJ _{NCV}	1840	1540	1610	1720

TABLE 24. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	4.77E+01	4.02E+01	4.64E+01	5.34E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	8.46E-02	2.02E-01
PERT	MJ _{NCV}	4.77E+01	4.02E+01	4.65E+01	5.36E+01
PENRE	MJ _{NCV}	1.93E+03	1.63E+03	1.69E+03	1.80E+03
PENRM	MJ _{NCV}	1.11E+01	1.10E+01	1.81E+01	2.28E+01
PENRT	MJ _{NCV}	1.94E+03	1.64E+03	1.71E+03	1.82E+03
SM	kg	1.25E+02	4.06E+02	3.85E+02	4.21E+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	3.16E+00	3.07E+00	3.17E+00	3.14E+00
HWD	kg	1.63E-05	1.45E-05	3.69E-05	5.86E-05
NHWD	kg	1.81E+00	1.36E+00	3.14E+00	4.46E+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

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

Indicator	Unit	TfNSW LCC B80 40 MPa PUMP B1 EXPOSURE	TfNSW LCC B80 40 MPa PUMP B2 EXPOSURE	TfNSW LCC B80 50 MPa PUMP B1 EXPOSURE	TfNSW LCC B80 50 MPa PUMP B2 EXPOSURE	TfNSW LCC B80 60 MPa PUMP B2 / C1 EXPOSURE	TfNSW LCC B80 65 MPa PUMP B2 / C1 EXPOSURE
GWP	kg CO ₂ eq.	279	210	257	222	237	246
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	0.421	0.353	0.408	0.373	0.391	0.405
EP	kg PO ₄ ³⁻ eq	0.102	0.0839	0.0974	0.0879	0.0924	0.0951
POCP	kg C ₂ H ₄ eq	0.0284	0.0270	0.0294	0.0285	0.0296	0.0306
ADPE	kg Sb eq	6.64E-06	7.20E-06	8.46E-06	1.05E-05	1.03E-05	1.30E-05
ADPF	MJ _{NCV}	1670	1440	1690	1540	1630	1680

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

Indicator	Unit	TfNSW LCC B80 40 MPa PUMP B1 EXPOSURE	TfNSW LCC B80 40 MPa PUMP B2 EXPOSURE	TfNSW LCC B80 50 MPa PUMP B1 EXPOSURE	TfNSW LCC B80 50 MPa PUMP B2 EXPOSURE	TfNSW LCC B80 60 MPa PUMP B2 / C1 EXPOSURE	TfNSW LCC B80 65 MPa PUMP B2 / C1 EXPOSURE
PERE	MJ _{NCV}	4.36E+01	3.90E+01	4.55E+01	4.23E+01	4.46E+01	4.66E+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}	4.36E+01	3.91E+01	4.56E+01	4.24E+01	4.47E+01	4.66E+01
PENRE	MJ _{NCV}	1.69E+03	1.45E+03	1.70E+03	1.54E+03	1.64E+03	1.69E+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}	1.70E+03	1.46E+03	1.71E+03	1.56E+03	1.65E+03	1.71E+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	3.08E+00	3.08E+00	3.04E+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	1.41E+00	1.48E+00	1.83E+00	2.30E+00	2.21E+00	2.95E+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

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TABLE 27. 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	ENVISIA® 50 MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65 MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65 MPa PRECAST TUNNEL SEGMENTS (30% SCM)
GWP	kg CO ₂ eq.	259	281	323	267	290	273
ODP	kg CFC11 eq	2.46E-06	2.57E-06	2.65E-06	2.49E-06	2.28E-06	2.30E-06
AP	kg SO ₂ eq	0.420	0.452	0.508	0.452	0.452	0.434
EP	kg PO ₄ ³⁻ eq	0.0985	0.105	0.119	0.104	0.109	0.104
POCP	kg C ₂ H ₄ eq	0.0310	0.0333	0.0365	0.0330	0.0316	0.0312
ADPE	kg Sb eq	1.30E-05	1.62E-05	2.21E-05	1.71E-05	1.76E-05	1.76E-05
ADPF	MJ _{NCV}	1730	1880	2170	1920	1950	1890

TABLE 28. ENVIRONMENTAL PARAMETERS (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	ENVISIA® 50 MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65 MPa PRECAST TUNNEL SEGMENTS	SPECIAL 65 MPa PRECAST TUNNEL SEGMENTS (30% SCM)
PERE	MJ _{NCV}	4.92E+01	5.36E+01	6.47E+01	5.94E+01	5.98E+01	5.82E+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}	4.93E+01	5.38E+01	6.49E+01	5.96E+01	6.00E+01	5.84E+01
PENRE	MJ _{NCV}	1.75E+03	1.89E+03	2.17E+03	1.92E+03	1.95E+03	1.89E+03
PENRM	MJ _{NCV}	1.03E+01	1.14E+01	2.31E+01	3.07E+01	3.34E+01	3.34E+01
PENRT	MJ _{NCV}	1.76E+03	1.90E+03	2.20E+03	1.95E+03	1.99E+03	1.92E+03
SM	kg	2.73E+02	3.18E+02	2.98E+02	2.27E+02	1.48E+02	1.73E+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	2.98E+00	3.08E+00	3.32E+00	3.29E+00	3.29E+00
HWD	kg	3.34E-05	3.89E-05	6.04E-05	5.99E-05	6.28E-05	6.28E-05
NHWD	kg	2.93E+00	3.77E+00	4.60E+00	2.76E+00	2.72E+00	2.72E+00
RWD	kg	3.78E-03	4.62E-03	7.36E-03	7.33E-03	7.84E-03	7.84E-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	TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW B80 50 MPa TREMIE B2 EXPOSURE	TfNSW R82 5 MPa HAND / MACHINE PLACED	TfNSW R83 35 MPa HAND / MACHINE PLACED
GWP	kg CO ₂ eq.	239	233	116	289
ODP	kg CFC11 eq	2.99E-06	2.95E-06	2.55E-06	2.79E-06
AP	kg SO ₂ eq	0.408	0.403	0.247	0.447
EP	kg PO ₄ ³⁻ eq	0.096	0.095	0.058	0.108
POCP	kg C ₂ H ₄ eq	0.0341	0.0340	0.0238	0.0328
ADPE	kg Sb eq	8.74E-06	1.26E-05	1.76E-06	4.00E-06
ADPF	MJ _{NCV}	1590	1580	790	1670

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

Indicator	Unit	TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW B80 50 MPa TREMIE B2 EXPOSURE	TfNSW R82 5 MPa HAND / MACHINE PLACED	TfNSW R83 35 MPa HAND / MACHINE PLACED
PERE	MJ _{NCV}	4.20E+01	4.39E+01	2.00E+01	4.18E+01
PERM	MJ _{NCV}	0.00E+00	2.40E-02	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.20E+01	4.40E+01	2.00E+01	4.18E+01
PENRE	MJ _{NCV}	1.68E+03	1.66E+03	8.73E+02	1.77E+03
PENRM	MJ _{NCV}	1.37E+01	2.05E+01	2.19E+00	2.19E+00
PENRT	MJ _{NCV}	1.69E+03	1.68E+03	8.75E+02	1.77E+03
SM	kg	4.13E+02	3.87E+02	1.69E+02	1.14E+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	3.00E+00	3.06E+00	3.26E+00	3.20E+00
HWD	kg	1.92E-05	3.10E-05	2.95E-06	4.75E-06
NHWD	kg	1.87E+00	2.49E+00	4.17E-01	1.15E+00
RWD	kg	3.60E-03	5.34E-03	5.49E-04	9.72E-04
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 31. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	THERMAL FTB 45	THERMAL FTB 60
GWP	kg CO₂ eq.	64	76
ODP	kg CFC11 eq	1.69E-06	1.63E-06
AP	kg SO ₂ eq	0.160	0.169
EP	kg PO ₄ ³⁻ eq	0.0367	0.0391
POCP	kg C ₂ H ₄ eq	0.0148	0.0148
ADPE	kg Sb eq	4.17E-07	4.27E-07
ADPF	MJ _{NCV}	510	560

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

Indicator	Unit	THERMAL FTB 45	THERMAL FTB 60
PERE	MJ _{NCV}	1.25E+01	1.38E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00
PERT	MJ _{NCV}	1.25E+01	1.38E+01
PENRE	MJ _{NCV}	5.23E+02	5.74E+02
PENRM	MJ _{NCV}	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	5.23E+02	5.74E+02
SM	kg	1.26E+02	1.11E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00
FW	m ³	3.31E+00	3.16E+00
HWD	kg	0.00E+00	0.00E+00
NHWD	kg	1.55E-01	1.65E-01
RWD	kg	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00
EE	MJ	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® 40 GPa / 65 MPa HIGH EARLY	ASPIRE® 40 GPa / 65 MPa	ASPIRE® 42 GPa / 50 MPa	ASPIRE® 45 GPa / 80 MPa HIGH EARLY	ASPIRE® 45 GPa / 80 MPa	ASPIRE® 45 GPa / 80 MPa LOW HEAT	ASPIRE® 45 GPa / 80 MPa LATE AGE / LOW HEAT
GWP	kg CO ₂ eq.	414	366	375	447	381	380	387
ODP	kg CFC11 eq	3.46E-06	3.48E-06	3.50E-06	4.27E-06	4.22E-06	4.28E-06	4.13E-06
AP	kg SO ₂ eq	0.634	0.598	0.609	0.680	0.611	0.595	0.596
EP	kg PO ₄ ³⁻ eq	0.145	0.133	0.135	0.157	0.139	0.141	0.142
POCP	kg C ₂ H ₄ eq	0.0464	0.0456	0.0462	0.0541	0.0516	0.0507	0.0496
ADPE	kg Sb eq	2.30E-05	2.30E-05	2.36E-05	2.15E-05	2.22E-05	1.67E-05	1.68E-05
ADPF	MJ _{NCV}	2570	2400	2450	2790	2520	2390	2380

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

Indicator	Unit	ASPIRE® 40 GPa / 65 MPa HIGH EARLY	ASPIRE® 40 GPa / 65 MPa	ASPIRE® 42 GPa / 50 MPa	ASPIRE® 45 GPa / 80 MPa HIGH EARLY	ASPIRE® 45 GPa / 80 MPa	ASPIRE® 45 GPa / 80 MPa LOW HEAT	ASPIRE® 45 GPa / 80 MPa LATE AGE / LOW HEAT
PERE	MJ _{NCV}	7.39E+01	7.05E+01	7.22E+01	7.53E+01	6.92E+01	6.33E+01	6.32E+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}	7.41E+01	7.08E+01	7.25E+01	7.56E+01	6.94E+01	6.35E+01	6.35E+01
PENRE	MJ _{NCV}	2.61E+03	2.44E+03	2.49E+03	2.84E+03	2.57E+03	2.41E+03	2.40E+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}	2.63E+03	2.46E+03	2.51E+03	2.86E+03	2.59E+03	2.42E+03	2.42E+03
SM	kg	1.56E+02	2.22E+02	2.23E+02	1.81E+02	2.64E+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	3.22E+00	3.26E+00	3.25E+00	3.16E+00	3.17E+00	3.05E+00	3.01E+00
HWD	kg	6.59E-05	6.59E-05	6.81E-05	5.97E-05	6.04E-05	5.37E-05	5.39E-05
NHWD	kg	4.69E+00	4.71E+00	4.82E+00	4.51E+00	4.72E+00	3.15E+00	3.12E+00
RWD	kg	7.11E-03	7.11E-03	7.33E-03	6.52E-03	6.69E-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 35. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M³

Indicator	Unit	ASPIRE® 46 GPa / 65 MPa	ASPIRE® 47 GPa / 80 MPa	ASPIRE® 50 GPa / 100 MPa HIGH EARLY	ASPIRE® 50 GPa / 100 MPa	ASPIRE® 50 GPa / 100 MPa LOW HEAT	ASPIRE® 50 GPa / 100 MPa LATE AGE LOW HEAT	HIGH STRENGTH 100 MPa @ 90 DAYS	HIGH STRENGTH 120 MPa @ 90 DAYS
GWP	kg CO ₂ eq.	381	384	454	383	383	402	428	449
ODP	kg CFC11 eq	4.22E-06	4.34E-06	4.33E-06	4.38E-06	4.31E-06	4.28E-06	2.71E-06	4.23E-06
AP	kg SO ₂ eq	0.611	0.623	0.683	0.612	0.601	0.617	0.637	0.694
EP	kg PO ₄ ³⁻ eq	0.139	0.140	0.159	0.140	0.142	0.147	0.147	0.159
POCP	kg C ₂ H ₄ eq	0.0516	0.0530	0.0543	0.0526	0.0513	0.0514	0.0422	0.0555
ADPE	kg Sb eq	2.22E-05	2.44E-05	1.76E-05	1.75E-05	1.77E-05	1.77E-05	3.52E-05	3.21E-05
ADPF	MJ _{NCV}	2520	2560	2810	2540	2430	2470	2690	2910

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

Indicator	Unit	ASPIRE® 46 GPa / 65 MPa	ASPIRE® 47 GPa / 80 MPa	ASPIRE® 50 GPa / 100 MPa HIGH EARLY	ASPIRE® 50 GPa / 100 MPa	ASPIRE® 50 GPa / 100 MPa LOW HEAT	ASPIRE® 50 GPa / 100 MPa LATE AGE LOW HEAT	HIGH STRENGTH 100 MPa @ 90 DAYS	HIGH STRENGTH 120 MPa @ 90 DAYS
PERE	MJ _{NCV}	6.92E+01	6.99E+01	7.48E+01	6.84E+01	6.49E+01	6.57E+01	8.20E+01	8.37E+01
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}	6.94E+01	7.02E+01	7.51E+01	6.86E+01	6.52E+01	6.60E+01	8.23E+01	8.40E+01
PENRE	MJ _{NCV}	2.57E+03	2.61E+03	2.87E+03	2.59E+03	2.44E+03	2.49E+03	2.72E+03	2.95E+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}	2.59E+03	2.63E+03	2.88E+03	2.61E+03	2.46E+03	2.50E+03	2.75E+03	2.98E+03
SM	kg	2.64E+02	2.92E+02	1.95E+02	2.92E+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	3.15E+00	3.16E+00	3.16E+00	3.05E+00	3.03E+00	3.02E+00	3.16E+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	4.72E+00	5.51E+00	3.41E+00	3.42E+00	3.32E+00	3.29E+00	7.72E+00	6.37E+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



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 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 51

- 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 52

- 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

Lower carbon concrete products

Table No. 7 and 8 53

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

Table No. 9 and 10 54

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

Table No. 11 and 12 55

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

Table No. 13 and 14 56

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

Concrete for special applications

Table No 15 and 16 57

- 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. 17 and 18 58

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

Table No. 19 and 20 59

- NO FINES 6:1
- STABILISED SAND 14:1
- STABILISED SAND 8:1
- STABILISED SAND 4:1

Table No. 21 and 22 60

- 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. 23 and 24 61

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

Table No. 25 and 26 62

- THERMAL FTB 45
- THERMAL FTB 60

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

Newcastle 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	
263	280	306	349	444	
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	
199	220	250	324	410	
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	
188	200	218	247	313	
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa	
202	221	253	310	384	
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa	
183	200	231	276	345	
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
178	193	219	262	329	
ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa		
197	250	325	332		
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
335	323	315	427	472	485
TREMIE 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
299	370	461	348	245	279
NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1		
193	71	123	210		

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

Newcastle region

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
308	314	322	341
TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND / MACHINE PLACED	TfNSW R83 35 MPa HAND / MACHINE PLACED	
426	101	281	
THERMAL FTB 45	THERMAL FTB 60		
60	72		

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.	263	280	306	349	444
ODP	kg CFC11 eq	2.36E-06	2.41E-06	2.46E-06	2.55E-06	2.79E-06
AP	kg SO ₂ eq	0.383	0.404	0.435	0.488	0.603
EP	kg PO ₄ ³⁻ eq	0.0929	0.0980	0.106	0.119	0.147
POCP	kg C ₂ H ₄ eq	0.0290	0.0300	0.0315	0.0340	0.0397
ADPE	kg Sb eq	3.45E-06	3.57E-06	3.93E-06	4.69E-06	5.88E-06
ADPF	MJ _{NCV}	1540	1630	1770	2000	2500

TABLE 2. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.61E+01	3.83E+01	4.18E+01	4.77E+01	6.04E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.61E+01	3.83E+01	4.18E+01	4.77E+01	6.04E+01
PENRE	MJ _{NCV}	1.57E+03	1.66E+03	1.80E+03	2.03E+03	2.54E+03
PENRM	MJ _{NCV}	5.35E+00	5.53E+00	6.14E+00	7.60E+00	1.00E+01
PENRT	MJ _{NCV}	1.58E+03	1.67E+03	1.81E+03	2.04E+03	2.55E+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	3.00E+00	2.97E+00	2.90E+00	2.87E+00
HWD	kg	7.05E-06	7.28E-06	8.09E-06	9.98E-06	1.30E-05
NHWD	kg	7.57E-01	7.89E-01	8.68E-01	1.02E+00	1.26E+00
RWD	kg	1.31E-03	1.35E-03	1.50E-03	1.85E-03	2.40E-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

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TABLE 3. 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.	199	220	250	324	410
ODP	kg CFC11 eq	2.23E-06	2.28E-06	2.35E-06	2.52E-06	2.74E-06
AP	kg SO ₂ eq	0.307	0.333	0.369	0.458	0.563
EP	kg PO ₄ ³⁻ eq	0.0739	0.0803	0.0893	0.111	0.137
POCP	kg C ₂ H ₄ eq	0.0255	0.0267	0.0285	0.0328	0.0380
ADPE	kg Sb eq	3.31E-06	3.44E-06	3.81E-06	4.64E-06	5.81E-06
ADPF	MJ _{NCV}	1210	1320	1480	1870	2330

TABLE 4. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.80E+01	3.08E+01	3.48E+01	4.45E+01	5.61E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.80E+01	3.08E+01	3.48E+01	4.45E+01	5.61E+01
PENRE	MJ _{NCV}	1.24E+03	1.35E+03	1.51E+03	1.90E+03	2.37E+03
PENRM	MJ _{NCV}	5.35E+00	5.53E+00	6.14E+00	7.60E+00	1.00E+01
PENRT	MJ _{NCV}	1.24E+03	1.36E+03	1.52E+03	1.91E+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	2.97E+00	2.97E+00	2.94E+00	2.90E+00	2.85E+00
HWD	kg	7.05E-06	7.28E-06	8.09E-06	9.98E-06	1.30E-05
NHWD	kg	6.83E-01	7.21E-01	8.05E-01	9.92E-01	1.23E+00
RWD	kg	1.31E-03	1.35E-03	1.50E-03	1.85E-03	2.40E-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

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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.	188	200	218	247	313
ODP	kg CFC11 eq	2.46E-06	2.49E-06	2.82E-06	2.80E-06	3.12E-06
AP	kg SO ₂ eq	0.305	0.326	0.376	0.429	0.527
EP	kg PO ₄ ³⁻ eq	0.0708	0.0758	0.0876	0.0999	0.122
POCP	kg C ₂ H ₄ eq	0.0271	0.0280	0.0320	0.0342	0.0404
ADPE	kg Sb eq	3.14E-06	3.29E-06	3.85E-06	7.09E-06	1.13E-05
ADPF	MJ _{NCV}	1170	1260	2130	1710	2130

TABLE 6. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.66E+01	2.88E+01	3.35E+01	4.15E+01	5.43E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.61E-02	8.11E-02
PERT	MJ _{NCV}	2.66E+01	2.88E+01	3.35E+01	4.16E+01	5.44E+01
PENRE	MJ _{NCV}	1.20E+03	1.29E+03	1.50E+03	1.74E+03	2.17E+03
PENRM	MJ _{NCV}	2.01E+00	2.01E+00	2.21E+00	5.31E+00	1.07E+01
PENRT	MJ _{NCV}	1.20E+03	1.29E+03	1.50E+03	1.75E+03	2.18E+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	2.97E+00	2.95E+00	3.06E+00	2.88E+00	2.80E+00
HWD	kg	4.00E-06	4.11E-06	4.66E-06	1.38E-05	2.66E-05
NHWD	kg	8.49E-01	9.03E-01	1.06E+00	1.73E+00	2.55E+00
RWD	kg	8.06E-04	8.33E-04	9.48E-04	2.01E-03	3.55E-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

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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 CO₂ eq.	202	221	253	310	384
ODP	kg CFC11 eq	2.24E-06	2.29E-06	2.35E-06	2.67E-06	2.91E-06
AP	kg SO ₂ eq	0.311	0.334	0.372	0.453	0.546
EP	kg PO ₄ ³⁻ eq	0.0748	0.0805	0.0899	0.1086	0.1312
POCP	kg C ₂ H ₄ eq	0.0257	0.0268	0.0286	0.0339	0.0389
ADPE	kg Sb eq	3.50E-06	3.63E-06	4.02E-06	4.90E-06	6.12E-06
ADPF	Mj _{NCV}	1230	1330	1490	1840	2250

TABLE 8. ENVIRONMENTAL PARAMETERS (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
PERE	Mj _{NCV}	2.85E+01	3.10E+01	3.52E+01	4.39E+01	5.43E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	2.85E+01	3.10E+01	3.52E+01	4.39E+01	5.43E+01
PENRE	Mj _{NCV}	1.24E+03	1.34E+03	1.51E+03	1.86E+03	2.27E+03
PENRM	Mj _{NCV}	5.84E+00	6.03E+00	6.69E+00	8.29E+00	1.09E+01
PENRT	Mj _{NCV}	1.24E+03	1.34E+03	1.51E+03	1.86E+03	2.28E+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	2.99E+00	2.94E+00	2.86E+00	2.78E+00
HWD	kg	7.64E-06	7.88E-06	8.76E-06	1.08E-05	1.41E-05
NHWD	kg	7.09E-01	7.44E-01	8.32E-01	1.04E+00	1.27E+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

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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 CO₂ eq.	183	200	231	276	345
ODP	kg CFC11 eq	2.47E-06	2.51E-06	2.78E-06	2.80E-06	3.12E-06
AP	kg SO ₂ eq	0.306	0.326	0.373	0.429	0.527
EP	kg PO ₄ ³⁻ eq	0.0710	0.0758	0.0868	0.0998	0.122
POCP	kg C ₂ H ₄ eq	0.0273	0.0282	0.0316	0.0343	0.0405
ADPE	kg Sb eq	3.28E-06	3.44E-06	4.01E-06	7.53E-06	1.21E-05
ADPF	Mj _{NCV}	1180	1260	1450	1710	2140

TABLE 10. ENVIRONMENTAL PARAMETERS (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
PERE	Mj _{NCV}	2.67E+01	2.88E+01	3.34E+01	4.18E+01	5.49E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	Mj _{NCV}	2.67E+01	2.88E+01	3.34E+01	4.18E+01	5.49E+01
PENRE	Mj _{NCV}	1.19E+03	1.27E+03	1.47E+03	1.72E+03	2.15E+03
PENRM	Mj _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	Mj _{NCV}	1.19E+03	1.28E+03	1.47E+03	1.73E+03	2.17E+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	3.02E+00	3.00E+00	2.97E+00	2.91E+00	2.80E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	8.78E-01	9.32E-01	1.09E+00	1.82E+00	2.69E+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

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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.	178	193	219	262	329
ODP	kg CFC11 eq	2.70E-06	2.73E-06	2.81E-06	2.98E-06	3.40E-06
AP	kg SO ₂ eq	0.313	0.332	0.365	0.425	0.528
EP	kg PO ₄ ³⁻ eq	0.0711	0.0755	0.0834	0.0972	0.120
POCP	kg C ₂ H ₄ eq	0.0292	0.0301	0.0319	0.0355	0.0427
ADPE	kg Sb eq	3.32E-06	3.47E-06	3.95E-06	7.54E-06	1.22E-05
ADPF	MJ _{NCV}	1190	1280	1420	1680	2120

TABLE 12. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.72E+01	2.93E+01	3.29E+01	4.12E+01	5.43E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.61E-02	8.11E-02
PERT	MJ _{NCV}	2.72E+01	2.93E+01	3.29E+01	4.12E+01	5.44E+01
PENRE	MJ _{NCV}	1.23E+03	1.32E+03	1.46E+03	1.73E+03	2.18E+03
PENRM	MJ _{NCV}	2.01E+00	2.01E+00	2.21E+00	5.31E+00	1.07E+01
PENRT	MJ _{NCV}	1.24E+03	1.32E+03	1.46E+03	1.73E+03	2.19E+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	3.11E+00	2.98E+00	2.95E+00	2.90E+00	2.83E+00
HWD	kg	4.00E-06	4.11E-06	4.66E-06	1.38E-05	2.66E-05
NHWD	kg	8.75E-01	9.31E-01	1.07E+00	1.75E+00	2.58E+00
RWD	kg	8.06E-04	8.33E-04	9.48E-04	2.01E-03	3.55E-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

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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 CO ₂ eq.	197	250	325	332
ODP	kg CFC11 eq	3.78E-06	3.98E-06	4.03E-06	4.44E-06
AP	kg SO ₂ eq	0.400	0.477	0.563	0.581
EP	kg PO ₄ ³⁻ eq	0.0849	0.102	0.124	0.127
POCP	kg C ₂ H ₄ eq	0.0408	0.0454	0.0489	0.0515
ADPE	kg Sb eq	2.50E-06	7.79E-06	1.25E-05	1.34E-06
ADPF	MJ _{NCV}	1530	1870	2250	2280

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

Indicator	Unit	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
PERE	MJ _{NCV}	3.52E+01	4.51E+01	5.74E+01	5.19E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	8.56E-02	0.00E+00
PERT	MJ _{NCV}	3.52E+01	4.51E+01	5.75E+01	5.19E+01
PENRE	MJ _{NCV}	1.57E+03	1.91E+03	2.29E+03	2.33E+03
PENRM	MJ _{NCV}	6.67E+00	1.16E+01	1.40E+01	0.00E+00
PENRT	MJ _{NCV}	1.58E+03	1.92E+03	2.30E+03	2.33E+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	2.96E+00	2.94E+00	3.00E+00
HWD	kg	7.15E-06	1.62E-05	3.08E-05	0.00E+00
NHWD	kg	5.18E-01	1.76E+00	2.74E+00	6.85E-01
RWD	kg	1.24E-03	3.05E-03	4.22E-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

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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.	335	323	315	427	472	485
ODP	kg CFC11 eq	2.78E-06	2.52E-06	2.52E-06	2.71E-06	2.81E-06	3.70E-06
AP	kg SO ₂ eq	0.485	0.454	0.445	0.581	0.646	0.700
EP	kg PO ₄ ³⁻ eq	0.117	0.111	0.109	0.142	0.155	0.164
POCP	kg C ₂ H ₄ eq	0.0355	0.0325	0.0321	0.0389	0.0425	0.0505
ADPE	kg Sb eq	7.66E-06	2.55E-06	2.51E-06	5.87E-06	1.35E-05	1.16E-05
ADPF	MJ _{NCV}	1960	1860	1810	2420	2690	2880

TABLE 16. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	4.68E+01	4.36E+01	4.25E+01	5.91E+01	6.75E+01	9.64E+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}	4.68E+01	4.36E+01	4.25E+01	5.91E+01	6.75E+01	9.64E+01
PENRE	MJ _{NCV}	1.99E+03	1.89E+03	1.85E+03	2.46E+03	2.73E+03	2.90E+03
PENRM	MJ _{NCV}	7.72E+00	7.02E+00	6.84E+00	9.47E+00	9.83E+00	2.16E+01
PENRT	MJ _{NCV}	2.00E+03	1.90E+03	1.85E+03	2.47E+03	2.74E+03	2.92E+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	3.36E+00	2.96E+00	2.96E+00	2.80E+00	2.84E+00	-5.65E+01
HWD	kg	1.29E-05	7.53E-06	7.34E-06	1.60E-05	2.49E-05	2.31E-05
NHWD	kg	1.84E+00	4.38E-01	4.28E-01	1.16E+00	3.27E+00	6.79E-01
RWD	kg	2.51E-03	1.31E-03	1.28E-03	2.80E-03	4.71E-03	4.02E-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 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
GWP	kg CO₂ eq.	299	370	461	348	245	279
ODP	kg CFC11 eq	2.51E-06	2.65E-06	2.86E-06	2.45E-06	2.32E-06	2.31E-06
AP	kg SO ₂ eq	0.435	0.521	0.642	0.479	0.359	0.397
EP	kg PO ₄ ³⁻ eq	0.104	0.126	0.154	0.117	0.0874	0.0969
POCP	kg C ₂ H ₄ eq	0.0321	0.0365	0.0429	0.0331	0.0280	0.0293
ADPE	kg Sb eq	8.91E-06	1.14E-05	2.15E-05	2.96E-06	2.26E-06	2.72E-06
ADPF	MJ _{NCV}	1750	2150	2680	1980	1450	1620

TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (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
PERE	MJ _{NCV}	4.42E+01	5.54E+01	7.32E+01	4.71E+01	3.35E+01	3.82E+01
PERM	MJ _{NCV}	9.01E-02	9.01E-02	1.71E-01	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	4.43E+01	5.55E+01	7.34E+01	4.71E+01	3.35E+01	3.82E+01
PENRE	MJ _{NCV}	1.78E+03	2.18E+03	2.71E+03	2.01E+03	1.48E+03	1.65E+03
PENRM	MJ _{NCV}	6.38E+00	1.39E+01	2.27E+01	8.74E+00	6.49E+00	8.34E+00
PENRT	MJ _{NCV}	1.79E+03	2.20E+03	2.74E+03	2.02E+03	1.48E+03	1.66E+03
SM	kg	1.35E+02	1.53E+02	9.94E+01	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
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.00E+00	2.86E+00	2.88E+00	2.71E+00	3.10E+00	2.98E+00
HWD	kg	2.17E-05	3.03E-05	5.50E-05	9.38E-06	7.22E-06	9.20E-06
NHWD	kg	2.01E+00	2.30E+00	4.47E+00	4.72E-01	3.44E-01	3.90E-01
RWD	kg	2.46E-03	4.00E-03	7.23E-03	1.63E-03	1.25E-03	1.59E-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 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
GWP	kg CO ₂ eq.	193	71	123	210
ODP	kg CFC11 eq	2.07E-06	1.17E-06	1.33E-06	1.53E-06
AP	kg SO ₂ eq	0.294	0.121	0.184	0.290
EP	kg PO ₄ ³⁻ eq	0.0712	0.0286	0.0443	0.0710
POCP	kg C ₂ H ₄ eq	0.0237	0.0120	0.0153	0.0206
ADPE	kg Sb eq	1.69E-06	1.79E-07	2.90E-07	1.79E-06
ADPF	Mj _{NCV}	1160	450	720	1200

TABLE 20. ENVIRONMENTAL PARAMETERS (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
PERE	Mj _{NCV}	2.69E+01	9.42E+00	1.59E+01	2.84E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	2.69E+01	9.42E+00	1.59E+01	2.84E+01
PENRE	Mj _{NCV}	1.19E+03	4.67E+02	7.41E+02	1.22E+03
PENRM	Mj _{NCV}	4.21E+00	0.00E+00	0.00E+00	5.79E+00
PENRT	Mj _{NCV}	1.19E+03	4.67E+02	7.41E+02	1.23E+03
SM	kg	4.81E+01	4.39E+01	6.66E+01	1.11E+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	2.39E+00	2.44E+00	2.47E+00	2.32E+00
HWD	kg	4.52E-06	2.57E-07	2.57E-07	6.47E-06
NHWD	kg	2.81E-01	9.84E-02	1.57E-01	2.86E-01
RWD	kg	7.86E-04	3.83E-05	3.83E-05	1.12E-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 21. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (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.	308	314	322	341
ODP	kg CFC11 eq	2.52E-06	2.63E-06	2.70E-06	2.71E-06
AP	kg SO ₂ eq	0.442	0.453	0.475	0.503
EP	kg PO ₄ ³⁻ eq	0.107	0.110	0.114	0.119
POCP	kg C ₂ H ₄ eq	0.0323	0.0334	0.0353	0.0368
ADPE	kg Sb eq	5.72E-06	6.09E-06	1.41E-05	2.02E-05
ADPF	MJ _{NCV}	1790	1840	1940	2060

TABLE 22. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (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
PERE	MJ _{NCV}	4.30E+01	4.43E+01	5.07E+01	5.80E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	7.93E-02	1.89E-01
PERT	MJ _{NCV}	4.30E+01	4.43E+01	5.08E+01	5.82E+01
PENRE	MJ _{NCV}	1.83E+03	1.87E+03	1.97E+03	2.09E+03
PENRM	MJ _{NCV}	8.65E+00	1.01E+01	1.64E+01	2.06E+01
PENRT	MJ _{NCV}	1.84E+03	1.88E+03	1.98E+03	2.11E+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	2.93E+00	2.95E+00	3.04E+00	3.03E+00
HWD	kg	1.19E-05	1.34E-05	3.40E-05	5.40E-05
NHWD	kg	1.23E+00	1.24E+00	2.90E+00	4.10E+00
RWD	kg	2.23E-03	2.50E-03	4.97E-03	6.67E-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 23. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (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 CO ₂ eq.	426	101	281
ODP	kg CFC11 eq	2.74E-06	2.05E-06	2.49E-06
AP	kg SO ₂ eq	0.578	0.192	0.406
EP	kg PO ₄ ³⁻ eq	0.143	0.0450	0.0990
POCP	kg C ₂ H ₄ eq	0.0388	0.0203	0.0306
ADPE	kg Sb eq	5.52E-06	3.29E-06	2.37E-06
ADPF	Mj _{NCV}	2440	700	1640

TABLE 24. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (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
PERE	Mj _{NCV}	5.97E+01	1.56E+01	3.83E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	5.97E+01	1.56E+01	3.83E+01
PENRE	Mj _{NCV}	2.47E+03	7.25E+02	1.67E+03
PENRM	Mj _{NCV}	1.91E+01	4.30E+00	6.32E+00
PENRT	Mj _{NCV}	2.49E+03	7.29E+02	1.68E+03
SM	kg	9.82E+01	1.64E+02	7.21E+01
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	2.77E+00	2.99E+00	2.97E+00
HWD	kg	2.05E-05	6.30E-06	6.97E-06
NHWD	kg	6.14E-01	6.80E-01	3.91E-01
RWD	kg	3.56E-03	1.20E-03	1.21E-03
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

Newcastle region

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

Indicator	Unit	THERMAL FTB 45	THERMAL FTB 60
GWP	kg CO₂ eq.	60	72
ODP	kg CFC11 eq	1.99E-06	1.92E-06
AP	kg SO ₂ eq	0.141	0.152
EP	kg PO ₄ ³⁻ eq	0.0312	0.0341
POCP	kg C ₂ H ₄ eqv	0.0178	0.0177
ADPE	kg Sb eq	4.19E-07	4.29E-07
ADPF	MJ _{NCV}	470	530

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

Indicator	Unit	THERMAL FTB 45	THERMAL FTB 60
PERE	MJ _{NCV}	8.81E+00	1.03E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00
PERT	MJ _{NCV}	8.81E+00	1.03E+01
PENRE	MJ _{NCV}	4.93E+02	5.48E+02
PENRM	MJ _{NCV}	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	4.93E+02	5.48E+02
SM	kg	1.26E+02	1.11E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00
FW	m ³	3.20E+00	3.05E+00
HWD	kg	0.00E+00	0.00E+00
NHWD	kg	1.05E-01	1.18E-01
RWD	kg	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00
EE	MJ	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 10.....71

- 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 14.....73

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

Table No. 15 and 16.....74

- 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

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

- THERMAL FTB 45
- THERMAL FTB 60

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

Wollongong 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	
268	285	310	354	449	
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	
205	227	257	330	417	
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	
188	199	216	245	309	
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	
148	162	185	256	376	
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa	
205	227	257	310	388	
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa	
186	203	233	278	345	
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
181	198	224	268	334	
ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
173	180	193	247	321	327
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
339	330	321	429	499	529
TREMIE 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
309	378	471	374	254	288
NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1		
235	64	185	314		

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

Wollongong region

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
313	320	329	349
TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND / MACHINE PLACED	TfNSW R83 35 MPa HAND / MACHINE PLACED	
408	110	287	
THERMAL FTB 45	THERMAL FTB 60		
67	78		

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.	268	285	310	354	449
ODP	kg CFC11 eq	2.96E-06	2.96E-06	3.08E-06	3.21E-06	3.56E-06
AP	kg SO ₂ eq	0.409	0.409	0.460	0.511	0.626
EP	kg PO ₄ ³⁻ eq	0.0987	0.0987	0.111	0.124	0.153
POCP	kg C ₂ H ₄ eq	0.0335	0.0335	0.0363	0.0391	0.0458
ADPE	kg Sb eq	2.27E-06	2.27E-06	2.62E-06	2.99E-06	3.61E-06
ADPF	MJ _{NCV}	1600	1600	1830	2060	2570

TABLE 2. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.58E+01	3.80E+01	4.13E+01	4.70E+01	5.91E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.58E+01	3.80E+01	4.13E+01	4.70E+01	5.91E+01
PENRE	MJ _{NCV}	1.64E+03	1.73E+03	1.87E+03	2.10E+03	2.62E+03
PENRM	MJ _{NCV}	5.84E+00	6.31E+00	7.08E+00	8.32E+00	1.02E+01
PENRT	MJ _{NCV}	1.65E+03	1.74E+03	1.88E+03	2.11E+03	2.63E+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	3.69E-01	3.89E-01	4.20E-01	4.74E-01	5.88E-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.	205	227	257	330	417
ODP	kg CFC11 eq	3.04E-06	3.07E-06	3.17E-06	3.42E-06	3.73E-06
AP	kg SO ₂ eq	0.343	0.367	0.403	0.491	0.596
EP	kg PO ₄ ³⁻ eq	0.0820	0.0881	0.0969	0.119	0.145
POCP	kg C ₂ H ₄ eq	0.0318	0.0329	0.0349	0.0399	0.0460
ADPE	kg Sb eq	2.13E-06	2.28E-06	2.51E-06	2.94E-06	3.54E-06
ADPF	MJ _{NCV}	1300	1410	1570	1960	2420

TABLE 4. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.79E+01	3.06E+01	3.45E+01	4.38E+01	5.49E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.79E+01	3.06E+01	3.45E+01	4.38E+01	5.49E+01
PENRE	MJ _{NCV}	1.33E+03	1.44E+03	1.60E+03	2.00E+03	2.47E+03
PENRM	MJ _{NCV}	5.84E+00	6.31E+00	7.08E+00	8.32E+00	1.02E+01
PENRT	MJ _{NCV}	1.34E+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	3.01E+00	2.98E+00	2.93E+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	2.96E-01	3.22E-01	3.57E-01	4.46E-01	5.49E-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.	188	199	216	245	309
ODP	kg CFC11 eq	2.90E-06	2.95E-06	3.02E-06	3.14E-06	3.47E-06
AP	kg SO ₂ eq	0.326	0.340	0.362	0.398	0.481
EP	kg PO ₄ ³⁻ eq	0.0770	0.0805	0.0858	0.0947	0.115
POCP	kg C ₂ H ₄ eq	0.0306	0.0315	0.0328	0.0351	0.0407
ADPE	kg Sb eq	2.17E-06	2.30E-06	2.51E-06	2.86E-06	3.45E-06
ADPF	MJ _{NCV}	1290	1360	1460	1630	2020

TABLE 6. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.86E+01	3.03E+01	3.29E+01	3.72E+01	4.65E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.86E+01	3.03E+01	3.29E+01	3.72E+01	4.65E+01
PENRE	MJ _{NCV}	1.32E+03	1.39E+03	1.49E+03	1.67E+03	2.06E+03
PENRM	MJ _{NCV}	5.84E+00	6.31E+00	7.08E+00	8.32E+00	1.02E+01
PENRT	MJ _{NCV}	1.33E+03	1.40E+03	1.50E+03	1.68E+03	2.07E+03
SM	kg	2.29E+02	2.45E+02	2.70E+02	3.11E+02	4.01E+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	3.00E+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	3.83E-01	4.05E-01	4.37E-01	4.94E-01	6.13E-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.	148	162	185	256	376
ODP	kg CFC11 eq	3.05E-06	3.11E-06	3.21E-06	3.40E-06	3.65E-06
AP	kg SO ₂ eq	0.287	0.306	0.336	0.418	0.557
EP	kg PO ₄ ³⁻ eq	0.0666	0.0711	0.0782	0.0987	0.134
POCP	kg C ₂ H ₄ eq	0.0303	0.0315	0.0333	0.0377	0.0445
ADPE	kg Sb eq	4.01E-06	4.32E-06	4.80E-06	5.63E-06	7.86E-06
ADPF	MJ _{NCV}	1080	1170	1310	1670	2280

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

Indicator	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}	2.33E+01	2.55E+01	2.89E+01	3.78E+01	5.33E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.33E+01	2.55E+01	2.89E+01	3.78E+01	5.33E+01
PENRE	MJ _{NCV}	1.11E+03	1.20E+03	1.34E+03	1.71E+03	2.32E+03
PENRM	MJ _{NCV}	5.83E+00	6.31E+00	7.08E+00	8.32E+00	1.51E+01
PENRT	MJ _{NCV}	1.12E+03	1.21E+03	1.35E+03	1.71E+03	2.33E+03
SM	kg	2.72E+02	2.92E+02	3.25E+02	3.00E+02	1.78E+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	2.87E+00
HWD	kg	8.09E-06	8.75E-06	9.82E-06	1.15E-05	1.93E-05
NHWD	kg	8.60E-01	9.32E-01	1.05E+00	1.24E+00	1.49E+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.	205	227	257	310	388
ODP	kg CFC11 eq	3.04E-06	3.07E-06	3.17E-06	3.49E-06	3.71E-06
AP	kg SO ₂ eq	0.343	0.367	0.403	0.474	0.567
EP	kg PO ₄ ³⁻ eq	0.0820	0.0881	0.0969	0.114	0.137
POCP	kg C ₂ H ₄ eq	0.0318	0.0329	0.0349	0.0399	0.0449
ADPE	kg Sb eq	2.13E-06	2.28E-06	2.51E-06	2.93E-06	3.51E-06
ADPF	MJ _{NCV}	1300	1410	1570	1890	2310

TABLE 10. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.79E+01	3.06E+01	3.45E+01	4.21E+01	5.23E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.79E+01	3.06E+01	3.45E+01	4.21E+01	5.23E+01
PENRE	MJ _{NCV}	1.33E+03	1.44E+03	1.60E+03	1.93E+03	2.35E+03
PENRM	MJ _{NCV}	5.84E+00	6.31E+00	7.08E+00	8.32E+00	1.02E+01
PENRT	MJ _{NCV}	1.34E+03	1.45E+03	1.61E+03	1.94E+03	2.36E+03
SM	kg	1.00E+02	9.06E+01	9.18E+01	1.53E+02	1.76E+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	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	2.96E-01	3.22E-01	3.57E-01	4.52E-01	5.54E-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.	186	203	233	378	345
ODP	kg CFC11 eq	3.02E-06	3.08E-06	3.20E-06	3.36E-06	3.61E-06
AP	kg SO ₂ eq	0.326	0.347	0.385	0.443	0.530
EP	kg PO ₄ ³⁻ eq	0.0764	0.0815	0.0907	0.104	0.125
POCP	kg C ₂ H ₄ eq	0.0311	0.0323	0.0346	0.0381	0.0436
ADPE	kg Sb eq	3.33E-06	3.49E-06	4.00E-06	7.55E-06	1.21E-05
ADPF	MJ _{NCV}	1220	1310	1480	1740	2150

TABLE 12. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.58E+01	2.79E+01	3.24E+01	4.02E+01	5.26E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	2.58E+01	2.79E+01	3.24E+01	4.03E+01	5.27E+01
PENRE	MJ _{NCV}	1.25E+03	1.34E+03	1.52E+03	1.78E+03	2.19E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	MJ _{NCV}	1.25E+03	1.35E+03	1.52E+03	1.79E+03	2.20E+03
SM	kg	1.69E+02	1.69E+02	1.80E+02	2.12E+02	2.74E+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	2.92E+00	2.90E+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	8.70E-01	9.25E-01	1.08E+00	1.80E+00	2.67E+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.	181	198	224	268	334
ODP	kg CFC11 eq	3.07E-06	3.13E-06	3.23E-06	3.39E-06	3.69E-06
AP	kg SO ₂ eq	0.337	0.358	0.390	0.450	0.545
EP	kg PO ₄ ³⁻ eq	0.0762	0.0810	0.0888	0.103	0.123
POCP	kg C ₂ H ₄ eq	0.0319	0.0331	0.0351	0.0387	0.0450
ADPE	kg Sb eq	3.40E-06	3.56E-06	4.04E-06	7.62E-06	1.22E-05
ADPF	MJ _{NCV}	1240	1330	1470	1740	2160

TABLE 14. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.70E+01	2.92E+01	3.28E+01	4.11E+01	5.41E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	2.70E+01	2.92E+01	3.28E+01	4.11E+01	5.42E+01
PENRE	MJ _{NCV}	1.27E+03	1.37E+03	1.51E+03	1.78E+03	2.20E+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	1.78E+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	3.07E+00	3.05E+00	3.02E+00	2.96E+00	2.80E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	9.02E-01	9.61E-01	1.10E+00	1.83E+00	2.72E+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.	173	180	193	247	321	327
ODP	kg CFC11 eq	3.19E-06	3.26E-06	3.35E-06	3.63E-06	3.72E-06	3.92E-06
AP	kg SO ₂ eq	0.355	0.368	0.390	0.471	0.554	0.562
EP	kg PO ₄ ³⁻ eq	0.0761	0.0786	0.0830	0.101	0.121	0.123
POCP	kg C ₂ H ₄ eq	0.0340	0.0350	0.0366	0.0420	0.0460	0.0467
ADPE	kg Sb eq	2.36E-06	2.47E-06	2.70E-06	8.30E-06	1.34E-05	1.36E-06
ADPF	MJ _{NCV}	1330	1390	1490	1830	2210	2210

TABLE 16. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.08E+01	3.23E+01	3.49E+01	4.51E+01	5.73E+01	5.11E+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}	3.08E+01	3.23E+01	3.49E+01	4.51E+01	5.74E+01	5.11E+01
PENRE	MJ _{NCV}	1.36E+03	1.42E+03	1.52E+03	1.87E+03	2.25E+03	2.26E+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	1.43E+03	1.53E+03	1.88E+03	2.27E+03	2.26E+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	2.90E+00	2.95E+00
HWD	kg	6.56E-06	6.97E-06	7.79E-06	1.76E-05	3.34E-05	0.00E+00
NHWD	kg	4.50E-01	4.74E-01	5.17E-01	1.82E+00	2.88E+00	6.77E-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.	339	330	321	429	499	529
ODP	kg CFC11 eq	3.35E-06	3.30E-06	3.26E-06	3.72E-06	3.93E-06	4.08E-06
AP	kg SO ₂ eq	0.503	0.488	0.477	0.614	0.700	0.758
EP	kg PO ₄ ³⁻ eq	0.121	0.118	0.115	0.149	0.170	0.181
POCP	kg C ₂ H ₄ eq	0.0399	0.0390	0.0384	0.0471	0.0517	0.0563
ADPE	kg Sb eq	5.22E-06	3.04E-06	3.04E-06	9.02E-06	1.05E-05	2.67E-05
ADPF	MJ _{NCV}	2000	1950	1900	2520	2900	3180

TABLE 18. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	4.56E+01	4.42E+01	4.31E+01	6.14E+01	7.11E+01	8.73E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	8.66E-02	9.62E-02	2.89E-01
PERT	MJ _{NCV}	4.56E+01	4.42E+01	4.31E+01	6.15E+01	7.12E+01	8.76E+01
PENRE	MJ _{NCV}	2.04E+03	1.99E+03	1.94E+03	2.56E+03	2.95E+03	3.23E+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}	2.05E+03	2.00E+03	1.95E+03	2.58E+03	2.97E+03	3.26E+03
SM	kg	5.22E+01	5.50E+01	5.57E+01	9.81E+01	5.90E+01	1.40E+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	2.99E+00	2.94E+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	1.15E+00	4.54E-01	4.44E-01	1.50E+00	1.70E+00	5.00E+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.	309	378	471	374	254	288
ODP	kg CFC11 eq	3.52E-06	3.71E-06	3.94E-06	3.49E-06	3.29E-06	3.34E-06
AP	kg SO ₂ eq	0.496	0.576	0.690	0.541	0.406	0.445
EP	kg PO ₄ ³⁻ eq	0.114	0.134	0.163	0.131	0.0974	0.107
POCP	kg C ₂ H ₄ eq	0.0417	0.0461	0.0528	0.0423	0.0359	0.0377
ADPE	kg Sb eq	1.99E-05	2.03E-05	2.77E-05	3.58E-06	2.79E-06	2.99E-06
ADPF	MJ _{NCV}	1910	2270	2830	2190	1570	1750

TABLE 20. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	4.82E+01	5.75E+01	7.59E+01	5.00E+01	3.45E+01	3.89E+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}	4.83E+01	5.77E+01	7.60E+01	5.00E+01	3.45E+01	3.89E+01
PENRE	MJ _{NCV}	1.95E+03	2.32E+03	2.87E+03	2.23E+03	1.61E+03	1.79E+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}	1.96E+03	2.33E+03	2.90E+03	2.24E+03	1.61E+03	1.79E+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	2.83E+00	2.73E+00	2.83E+00	3.04E+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	5.04E+00	5.02E+00	5.95E+00	5.08E-01	3.63E-01	4.05E-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

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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 8:1	STABILISED SAND 4:1
GWP	kg CO ₂ eq.	235	64	185	314
ODP	kg CFC11 eq	2.63E-06	1.90E-06	2.16E-06	2.65E-06
AP	kg SO ₂ eq	0.361	0.151	0.286	0.442
EP	kg PO ₄ ³⁻ eq	0.0867	0.0346	0.0687	0.107
POCP	kg C ₂ H ₄ eq	0.0295	0.0173	0.0239	0.0329
ADPE	kg Sb eq	7.94E-07	4.80E-07	7.20E-07	9.80E-07
ADPF	Mj _{NCV}	1380	540	1120	1800

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

Indicator	Unit	NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1
PERE	Mj _{NCV}	2.95E+01	1.08E+01	2.50E+01	4.07E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	2.95E+01	1.08E+01	2.50E+01	4.07E+01
PENRE	Mj _{NCV}	1.42E+03	5.55E+02	1.15E+03	1.83E+03
PENRM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	Mj _{NCV}	1.42E+03	5.55E+02	1.15E+03	1.83E+03
SM	kg	8.08E+00	1.25E+02	6.14E+00	1.10E+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	2.47E+00	2.34E+00	2.42E+00	2.37E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	2.88E-01	1.68E-01	2.61E-01	4.03E-01
RWD	kg	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
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

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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 CO ₂ eq.	313	320	329	349
ODP	kg CFC11 eq	3.45E-06	3.55E-06	3.56E-06	3.65E-06
AP	kg SO ₂ eq	0.480	0.490	0.510	0.542
EP	kg PO ₄ ³⁻ eq	0.115	0.117	0.121	0.127
POCP	kg C ₂ H ₄ eq	0.0402	0.0410	0.0425	0.0449
ADPE	kg Sb eq	8.24E-06	6.47E-06	1.51E-05	2.19E-05
ADPF	MJ _{NCV}	1910	1930	2030	2180

TABLE 24. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	4.45E+01	4.39E+01	5.11E+01	5.90E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	8.46E-02	2.02E-01
PERT	MJ _{NCV}	4.45E+01	4.39E+01	5.11E+01	5.92E+01
PENRE	MJ _{NCV}	1.95E+03	1.98E+03	2.07E+03	2.21E+03
PENRM	MJ _{NCV}	1.11E+01	1.10E+01	1.81E+01	2.28E+01
PENRT	MJ _{NCV}	1.96E+03	1.99E+03	2.09E+03	2.24E+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	3.03E+00	3.01E+00
HWD	kg	1.63E-05	1.45E-05	3.69E-05	5.86E-05
NHWD	kg	1.77E+00	1.28E+00	3.07E+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

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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 CO ₂ eq.	408	110	287
ODP	kg CFC11 eq	3.86E-06	2.88E-06	3.45E-06
AP	kg SO ₂ eq	0.601	0.235	0.449
EP	kg PO ₄ ³⁻ eq	0.144	0.054	0.107
POCP	kg C ₂ H ₄ eq	0.0480	0.0273	0.0384
ADPE	kg Sb eq	1.30E-05	3.55E-06	4.03E-06
ADPF	Mj _{NCV}	2460	830	1730

TABLE 26. ENVIRONMENTAL PARAMETERS (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
PERE	Mj _{NCV}	5.97E+01	1.77E+01	3.76E+01
PERM	Mj _{NCV}	2.40E-02	0.00E+00	0.00E+00
PERT	Mj _{NCV}	5.98E+01	1.77E+01	3.76E+01
PENRE	Mj _{NCV}	2.50E+03	8.59E+02	1.77E+03
PENRM	Mj _{NCV}	2.05E+01	4.10E+00	2.19E+00
PENRT	Mj _{NCV}	2.52E+03	8.63E+02	1.77E+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	2.89E+00	3.10E+00	3.06E+00
HWD	kg	3.10E-05	8.49E-06	4.75E-06
NHWD	kg	2.54E+00	6.68E-01	1.09E+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

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

Indicator	Unit	THERMAL FTB 45	THERMAL FTB 60
GWP	kg CO₂ eq.	67	78
ODP	kg CFC11 eq	2.76E-06	2.66E-06
AP	kg SO ₂ eq	0.183	0.192
EP	kg PO ₄ ³⁻ eq	0.0397	0.0421
POCP	kg C ₂ H ₄ eq	0.0237	0.0234
ADPE	kg Sb eq	5.29E-07	5.32E-07
ADPF	MJ _{NCV}	560	610

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

Indicator	Unit	THERMAL FTB 45	THERMAL FTB 60
PERE	MJ _{NCV}	9.06E+00	1.04E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00
PERT	MJ _{NCV}	9.06E+00	1.04E+01
PENRE	MJ _{NCV}	5.88E+02	6.35E+02
PENRM	MJ _{NCV}	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	5.88E+02	6.35E+02
SM	kg	1.26E+02	1.11E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00
FW	m ³	3.17E+00	3.01E+00
HWD	kg	0.00E+00	0.00E+00
NHWD	kg	1.09E-01	1.20E-01
RWD	kg	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00
EE	MJ	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

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

- THERMAL FTB 45
- THERMAL FTB 60

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

Canberra 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	
270	288	314	358	454	
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	
210	231	262	336	424	
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	
194	206	224	254	321	
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa	
210	231	262	316	397	
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa	
193	210	240	286	355	
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
186	202	228	271	341	
ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
177	184	197	251	327	333
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
373	371	372	436	492	520
TREMIE 40 MPa	TREMIE 50 MPa	TREMIE 65 MPa	SHOTCRETE 40 MPa	KERB MACHINE 25 MPa	KERB MACHINE 32 MPa
314	387	477	363	259	295
NO FINES 6:1	STABILISED SAND 14:1	STABILISED SAND 8:1	STABILISED SAND 4:1		
237	117	188	318		

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

Canberra region

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
320	327	336	358
TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND/ MACHINE PLACED	TfNSW R83 35 MPa HAND/ MACHINE PLACED	
415	118	294	
THERMAL FTB 45	THERMAL FTB 60		
75	126		

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.	270	288	314	358	454
ODP	kg CFC11 eq	3.35E-06	3.45E-06	3.48E-06	3.68E-06	4.15E-06
AP	kg SO ₂ eq	0.419	0.442	0.471	0.525	0.646
EP	kg PO ₄ ³⁻ eq	0.101	0.106	0.114	0.127	0.157
POCP	kg C ₂ H ₄ eq	0.0369	0.0384	0.0398	0.0432	0.0509
ADPE	kg Sb eq	2.14E-06	2.23E-06	2.74E-06	3.10E-06	3.78E-06
ADPF	MJ _{NCV}	1640	1730	1870	2110	2630

TABLE 2. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.51E+01	3.73E+01	4.10E+01	4.66E+01	5.89E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.51E+01	3.73E+01	4.10E+01	4.66E+01	5.89E+01
PENRE	MJ _{NCV}	1.68E+03	1.78E+03	1.91E+03	2.16E+03	2.69E+03
PENRM	MJ _{NCV}	3.98E+00	4.17E+00	6.18E+00	7.50E+00	9.56E+00
PENRT	MJ _{NCV}	1.68E+03	1.78E+03	1.92E+03	2.16E+03	2.70E+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	2.99E+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	3.40E-01	3.61E-01	4.00E-01	4.54E-01	5.71E-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.	210	231	262	336	424
ODP	kg CFC11 eq	3.68E-06	3.73E-06	3.78E-06	4.16E-06	4.58E-06
AP	kg SO ₂ eq	0.363	0.388	0.423	0.516	0.625
EP	kg PO ₄ ³⁻ eq	0.0861	0.0923	0.101	0.124	0.151
POCP	kg C ₂ H ₄ eq	0.0373	0.0385	0.0403	0.0463	0.0533
ADPE	kg Sb eq	2.01E-06	2.10E-06	2.62E-06	3.05E-06	3.71E-06
ADPF	MJ _{NCV}	1360	1470	1630	2030	2510

TABLE 4. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.72E+01	2.99E+01	3.41E+01	4.35E+01	5.47E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.72E+01	2.99E+01	3.41E+01	4.35E+01	5.47E+01
PENRE	MJ _{NCV}	1.40E+03	1.51E+03	1.67E+03	2.08E+03	2.57E+03
PENRM	MJ _{NCV}	3.98E+00	4.17E+00	6.18E+00	7.50E+00	9.56E+00
PENRT	MJ _{NCV}	1.40E+03	1.52E+03	1.68E+03	2.09E+03	2.58E+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	3.08E+00	3.08E+00	2.97E+00	2.97E+00	2.93E+00
HWD	kg	4.53E-06	4.74E-06	6.84E-06	8.04E-06	1.03E-05
NHWD	kg	2.68E-01	2.93E-01	3.37E-01	4.25E-01	5.33E-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.	194	206	224	254	321
ODP	kg CFC11 eq	3.39E-06	3.49E-06	3.52E-06	3.73E-06	4.22E-06
AP	kg SO ₂ eq	0.361	0.380	0.402	0.447	0.544
EP	kg PO ₄ ³⁻ eq	0.0811	0.0852	0.0905	0.1005	0.1225
POCP	kg C ₂ H ₄ eq	0.0356	0.0370	0.0382	0.0414	0.0486
ADPE	kg Sb eq	2.12E-06	2.20E-06	2.71E-06	3.07E-06	3.75E-06
ADPF	MJ _{NCV}	1370	1450	1560	1750	2170

TABLE 6. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.98E+01	3.16E+01	3.47E+01	3.94E+01	4.96E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.98E+01	3.16E+01	3.47E+01	3.94E+01	4.96E+01
PENRE	MJ _{NCV}	1.41E+03	1.49E+03	1.59E+03	1.79E+03	2.21E+03
PENRM	MJ _{NCV}	3.98E+00	4.17E+00	6.18E+00	7.50E+00	9.56E+00
PENRT	MJ _{NCV}	1.41E+03	1.49E+03	1.60E+03	1.80E+03	2.22E+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	3.15E+00	3.16E+00	3.05E+00	3.04E+00	3.04E+00
HWD	kg	4.53E-06	4.74E-06	6.84E-06	8.04E-06	1.03E-05
NHWD	kg	3.68E-01	3.91E-01	4.33E-01	4.92E-01	6.21E-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

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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.	210	231	262	316	397
ODP	kg CFC11 eq	3.68E-06	3.73E-06	3.78E-06	4.17E-06	4.59E-06
AP	kg SO ₂ eq	0.363	0.388	0.423	0.501	0.605
EP	kg PO ₄ ³⁻ eq	0.0861	0.0923	0.101	0.119	0.144
POCP	kg C ₂ H ₄ eq	0.0373	0.0385	0.0403	0.0460	0.0528
ADPE	kg Sb eq	2.01E-06	2.10E-06	2.62E-06	3.08E-06	3.71E-06
ADPF	MJ _{NCV}	1360	1470	1630	1960	2410

TABLE 8. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.72E+01	2.99E+01	3.41E+01	4.21E+01	5.28E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.72E+01	2.99E+01	3.41E+01	4.21E+01	5.28E+01
PENRE	MJ _{NCV}	1.40E+03	1.51E+03	1.67E+03	2.01E+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}	1.40E+03	1.52E+03	1.68E+03	2.02E+03	2.48E+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	3.08E+00	3.08E+00	2.97E+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	2.68E-01	2.93E-01	3.37E-01	4.34E-01	5.43E-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

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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.	183	200	232	276	345
ODP	kg CFC11 eq	3.64E-06	3.67E-06	3.86E-06	4.05E-06	4.44E-06
AP	kg SO ₂ eq	0.355	0.374	0.416	0.478	0.576
EP	kg PO ₄ ³⁻ eq	0.0814	0.0861	0.0960	0.110	0.132
POCP	kg C ₂ H ₄ eq	0.0369	0.0378	0.0407	0.0447	0.0516
ADPE	kg Sb eq	3.66E-06	3.82E-06	4.34E-06	7.93E-06	1.25E-05
ADPF	MJ _{NCV}	1310	1390	1570	1850	2280

TABLE 10. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.67E+01	2.88E+01	3.31E+01	4.16E+01	5.45E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	3.85E-02	8.66E-02
PERT	MJ _{NCV}	2.67E+01	2.88E+01	3.31E+01	4.16E+01	5.46E+01
PENRE	MJ _{NCV}	1.35E+03	1.43E+03	1.62E+03	1.89E+03	2.33E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	5.86E+00	1.18E+01
PENRT	MJ _{NCV}	1.35E+03	1.44E+03	1.62E+03	1.90E+03	2.34E+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	3.07E+00	2.99E+00	3.11E+00	2.92E+00	2.84E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	1.49E-05	2.88E-05
NHWD	kg	8.63E-01	9.19E-01	1.07E+00	1.80E+00	2.68E+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

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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.	186	202	228	271	341
ODP	kg CFC11 eq	3.54E-06	3.63E-06	3.72E-06	3.87E-06	4.39E-06
AP	kg SO ₂ eq	0.351	0.373	0.405	0.460	0.569
EP	kg PO ₄ ³⁻ eq	0.0793	0.0844	0.0920	0.105	0.129
POCP	kg C ₂ H ₄ eq	0.0361	0.0376	0.0395	0.0427	0.0512
ADPE	kg Sb eq	3.70E-06	3.85E-06	4.34E-06	5.49E-06	1.26E-05
ADPF	MJ _{NCV}	1300	1390	1530	1770	2250

TABLE 12. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	2.71E+01	2.93E+01	3.28E+01	3.89E+01	5.45E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.66E-02
PERT	MJ _{NCV}	2.71E+01	2.93E+01	3.28E+01	3.89E+01	5.45E+01
PENRE	MJ _{NCV}	1.34E+03	1.43E+03	1.57E+03	1.82E+03	2.30E+03
PENRM	MJ _{NCV}	2.19E+00	2.19E+00	2.40E+00	3.01E+00	1.18E+01
PENRT	MJ _{NCV}	1.34E+03	1.43E+03	1.58E+03	1.82E+03	2.31E+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	2.92E+00	2.87E+00
HWD	kg	4.28E-06	4.40E-06	4.99E-06	6.48E-06	2.88E-05
NHWD	kg	8.88E-01	9.47E-01	1.09E+00	1.40E+00	2.71E+00
RWD	kg	8.62E-04	8.90E-04	1.01E-03	1.32E-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

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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.	177	184	197	251	327	333
ODP	kg CFC11 eq	3.58E-06	3.66E-06	3.78E-06	3.99E-06	4.27E-06	4.59E-06
AP	kg SO ₂ eq	0.366	0.379	0.403	0.479	0.572	0.584
EP	kg PO ₄ ³⁻ eq	0.0785	0.0812	0.0858	0.103	0.126	0.128
POCP	kg C ₂ H ₄ eq	0.0375	0.0387	0.0405	0.0453	0.0509	0.0526
ADPE	kg Sb eq	2.65E-06	2.77E-06	3.00E-06	8.61E-06	1.38E-05	1.67E-06
ADPF	MJ _{NCV}	1380	1440	1540	1880	2280	2290

TABLE 14. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.09E+01	3.24E+01	3.51E+01	4.51E+01	5.76E+01	5.13E+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}	3.09E+01	3.24E+01	3.51E+01	4.51E+01	5.77E+01	5.13E+01
PENRE	MJ _{NCV}	1.42E+03	1.48E+03	1.58E+03	1.92E+03	2.33E+03	2.35E+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}	1.42E+03	1.48E+03	1.59E+03	1.93E+03	2.34E+03	2.35E+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	3.19E+00	3.18E+00	3.13E+00	2.98E+00	2.96E+00	3.02E+00
HWD	kg	6.56E-06	6.97E-06	7.79E-06	1.76E-05	3.34E-05	0.00E+00
NHWD	kg	4.37E-01	4.62E-01	5.06E-01	1.81E+00	2.87E+00	6.66E-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

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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.	373	371	372	436	492	520
ODP	kg CFC11 eq	3.85E-06	3.75E-06	3.79E-06	4.70E-06	4.86E-06	4.93E-06
AP	kg SO ₂ eq	0.555	0.542	0.546	0.648	0.725	0.770
EP	kg PO ₄ ³⁻ eq	0.134	0.131	0.132	0.156	0.173	0.183
POCP	kg C ₂ H ₄ eq	0.0459	0.0443	0.0449	0.0556	0.0602	0.0629
ADPE	kg Sb eq	9.10E-06	3.14E-06	4.68E-06	9.24E-06	1.88E-05	2.29E-05
ADPF	MJ _{NCV}	2260	2180	2200	2620	2960	3190

TABLE 16. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	5.47E+01	4.82E+01	4.97E+01	6.09E+01	7.39E+01	8.44E+01
PERM	MJ _{NCV}	9.38E-02	0.00E+00	2.40E-02	8.66E-02	1.68E-01	2.89E-01
PERT	MJ _{NCV}	5.48E+01	4.82E+01	4.97E+01	6.10E+01	7.40E+01	8.47E+01
PENRE	MJ _{NCV}	2.30E+03	2.23E+03	2.25E+03	2.67E+03	3.02E+03	3.24E+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}	2.32E+03	2.23E+03	2.26E+03	2.69E+03	3.04E+03	3.27E+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	2.97E+00	3.02E+00	2.94E+00	2.85E+00	3.04E+00
HWD	kg	2.86E-05	8.11E-06	1.34E-05	2.97E-05	5.29E-05	7.61E-05
NHWD	kg	1.50E+00	4.68E-01	7.30E-01	1.48E+00	3.52E+00	3.81E+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

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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.	314	387	477	363	259	295
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	0.509	0.602	0.715	0.550	0.427	0.469
EP	kg PO ₄ ³⁻ eq	0.120	0.143	0.169	0.132	0.102	0.112
POCP	kg C ₂ H ₄ eq	0.0483	0.0545	0.0598	0.0491	0.0419	0.0440
ADPE	kg Sb eq	9.96E-06	1.26E-05	2.36E-05	3.21E-06	2.56E-06	3.48E-06
ADPF	MJ _{NCV}	1960	2390	2900	2180	1640	1830

TABLE 18. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	4.46E+01	5.58E+01	7.40E+01	4.68E+01	3.38E+01	3.92E+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}	4.47E+01	5.59E+01	7.42E+01	4.68E+01	3.38E+01	3.92E+01
PENRE	MJ _{NCV}	2.01E+03	2.44E+03	2.95E+03	2.24E+03	1.68E+03	1.88E+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}	2.02E+03	2.45E+03	2.98E+03	2.25E+03	1.69E+03	1.89E+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	2.92E+00	2.93E+00	2.85E+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	2.12E+00	2.43E+00	4.75E+00	4.53E-01	3.34E-01	3.93E-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

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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
GWP	kg CO₂ eq.	237	117	188	318
ODP	kg CFC11 eq	2.55E-06	2.53E-06	2.92E-06	3.57E-06
AP	kg SO ₂ eq	0.355	0.221	0.310	0.473
EP	kg PO ₄ ³⁻ eq	0.086	0.051	0.073	0.113
POCP	kg C ₂ H ₄ eq	0.0289	0.0244	0.0304	0.0408
ADPE	kg Sb eq	1.41E-06	3.33E-07	4.81E-07	7.54E-07
ADPF	MJ _{NCV}	1390	800	1180	1870

TABLE 20. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	3.02E+01	1.48E+01	2.33E+01	3.91E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.02E+01	1.48E+01	2.33E+01	3.91E+01
PENRE	MJ _{NCV}	1.42E+03	8.25E+02	1.21E+03	1.92E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.42E+03	8.25E+02	1.21E+03	1.92E+03
SM	kg	8.08E+00	3.55E+00	6.14E+00	1.10E+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	2.51E+00	2.47E+00	2.50E+00	2.46E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	2.96E-01	1.30E-01	2.08E-01	3.53E-01
RWD	kg	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
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

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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.	320	327	336	358
ODP	kg CFC11 eq	4.37E-06	4.35E-06	4.43E-06	4.66E-06
AP	kg SO ₂ eq	0.513	0.517	0.540	0.578
EP	kg PO ₄ ³⁻ eq	0.122	0.123	0.127	0.135
POCP	kg C ₂ H ₄ eq	0.0481	0.0480	0.0501	0.0536
ADPE	kg Sb eq	8.54E-06	6.83E-06	1.54E-05	2.21E-05
ADPF	MJ _{NCV}	2000	2030	2130	2280

TABLE 22. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	4.37E+01	4.41E+01	5.09E+01	5.88E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	8.46E-02	2.02E-01
PERT	MJ _{NCV}	4.37E+01	4.41E+01	5.10E+01	5.90E+01
PENRE	MJ _{NCV}	2.05E+03	2.07E+03	2.17E+03	2.33E+03
PENRM	MJ _{NCV}	1.11E+01	1.10E+01	1.81E+01	2.28E+01
PENRT	MJ _{NCV}	2.06E+03	2.09E+03	2.19E+03	2.35E+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	3.10E+00	3.00E+00	3.10E+00	3.09E+00
HWD	kg	1.63E-05	1.45E-05	3.69E-05	5.86E-05
NHWD	kg	1.75E+00	1.27E+00	3.05E+00	4.37E+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

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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.	415	118	294
ODP	kg CFC11 eq	4.86E-06	3.76E-06	4.19E-06
AP	kg SO ₂ eq	0.637	0.266	0.474
EP	kg PO ₄ ³⁻ eq	0.152	0.061	0.112
POCP	kg C ₂ H ₄ eq	0.0565	0.0343	0.0449
ADPE	kg Sb eq	1.33E-05	2.09E-06	4.37E-06
ADPF	MJ _{NCV}	2550	900	1810

TABLE 24. ENVIRONMENTAL PARAMETERS (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
PERE	MJ _{NCV}	5.90E+01	1.54E+01	3.76E+01
PERM	MJ _{NCV}	2.40E-02	0.00E+00	0.00E+00
PERT	MJ _{NCV}	5.90E+01	1.54E+01	3.76E+01
PENRE	MJ _{NCV}	2.61E+03	9.38E+02	1.86E+03
PENRM	MJ _{NCV}	2.05E+01	2.19E+00	2.19E+00
PENRT	MJ _{NCV}	2.63E+03	9.40E+02	1.86E+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	3.01E+00	3.19E+00	3.13E+00
HWD	kg	3.10E-05	2.95E-06	4.75E-06
NHWD	kg	2.51E+00	3.35E-01	1.08E+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	THERMAL FTB 45	THERMAL FTB 60
GWP	kg CO₂ eq.	75	126
ODP	kg CFC11 eq	2.17E-06	2.78E-06
AP	kg SO ₂ eq	0.155	0.241
EP	kg PO ₄ ³⁻ eq	0.0345	0.0549
POCP	kg C ₂ H ₄ eq	0.0188	0.0264
ADPE	kg Sb eq	1.10E-06	1.22E-06
ADPF	MJ _{NCV}	560	850

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

Indicator	Unit	THERMAL FTB 45	THERMAL FTB 60
PERE	MJ _{NCV}	1.10E+01	1.62E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00
PERT	MJ _{NCV}	1.10E+01	1.62E+01
PENRE	MJ _{NCV}	5.81E+02	8.83E+02
PENRM	MJ _{NCV}	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	5.81E+02	8.83E+02
SM	kg	1.11E+02	1.13E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00
FW	m ³	3.09E+00	2.77E+00
HWD	kg	0.00E+00	0.00E+00
NHWD	kg	1.11E-01	1.69E-01
RWD	kg	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00
EE	MJ	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:

- 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)
- Cement, Concrete and Aggregates Australia (CCAA).

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