



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 [epd-australasia.com](http://epd-australasia.com)

**Program:** The international EPD® System, [environdec.com](http://environdec.com)  
**Program Operator:** EPD International AB | **Regional Program:** EPD Australasia  
EPD Registration Number S-P-02336 (Version 1.4)

**Publication date:** 1 April 2021 | **Revised:** 26 June 2024 | **Valid until:** 1 April 2026  
**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"> <li>• Additional concrete products were added (Thermal Backfill, ASPIRE® high performance concrete and high strength concrete).</li> <li>• Organisation acronyms changed (ISC etc).</li> <li>• Units of measurement changed (MPa to MPa etc).</li> <li>• A summary table of GWP has been added for each region.</li> <li>• The aggregate size removed from the product names in the column headers.</li> <li>• The following editorial errors have been corrected: <ul style="list-style-type: none"> <li>– Various typographical errors upon rebranding (V1.1 – 15/10/2021) and in the initial document (V1.0 – 1/04/2021).</li> <li>– For the Newcastle region (Jesmond plant) results in Tables 23 and 24, the column heading: <ul style="list-style-type: none"> <li>– 'TfNSW B80 50 MPa 20MM PUMP B2 EXPOSURE' should have been labelled as 'TfNSW B80 50 MPa TREMIE B2 EXPOSURE'</li> <li>– 'TfNSW B80 50 MPa 20MM TREMIE B2 EXPOSURE' should have been labelled as 'TfNSW R82 5 MPa HAND / MACHINE PLACED', and</li> <li>– 'TfNSW R82 5 MPa 20MM HAND / MACHINE PLACED' should have also been labelled as 'TfNSW R83 35 MPa HAND / MACHINE PLACED'.</li> </ul> </li> </ul> </li> <li>• For the Newcastle region, Tables 13 and 17 contained the Sydney data for the equivalent products.</li> <li>• The total number of operating sites for the recycling and cement operations shown on page one were incorrect.</li> </ul>
Version 1.3	<p>The following edits were made as part of our second annual review:</p> <ul style="list-style-type: none"> <li>• The branding was updated.</li> <li>• Additional products were added (TfNSW LCC products, ASPIRE® low heat products, ENVIROCRETE® PLUS 65 MPa, 80 MPa products and precast tunnel products).</li> <li>• Minor changes to Sydney ENVIROCRETE® PLUS results (GWP +/-2-3%).</li> <li>• Slight decrease in Sydney ENVISIA® results (GWP up to 6% lower).</li> <li>• Minor changes to some of Newcastle ENVIROCRETE® results (GWP &lt;2% increase).</li> </ul>
Version 1.4	<p>Additional products and plants have been added to the EPD as follows:</p> <ul style="list-style-type: none"> <li>• Blockfill products have been added to all regions</li> <li>• Road Authority products have been added to the Newcastle region</li> <li>• Steel Fibrecrete and Low Carbon Steel Fibrecrete products have been added to the Sydney region</li> <li>• The plants at West Gosford and Kincumber have changed from being 'out of scope' to 'in scope'</li> </ul>

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

## CEN standard EN 15804 served as the core PCR

PCR	PCR 2012:01 Construction Products and Construction Services, Version 2.33, 2020-09-18 PCR 2012:01-SUB-PCR-G Concrete and concrete elements, 2020-09-18
PCR review was conducted by	The Technical Committee of the International EPD® System. Chair: Claudia A. Peña. Contact via info@environdec.com
Independent verification of the declaration and data, according to ISO 14025	<input type="checkbox"/> EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)
Procedure for follow-up of data during EPD validity involved third-party verifier	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes



# About Boral

**Boral is the largest integrated construction materials company in Australia, with a leading position underpinned by strategically located quarry reserves and an extensive network of operating sites.**

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

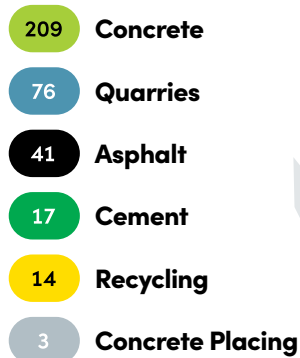
In the New South Wales (NSW) and the Australian Capital Territory (ACT) Boral Concrete supplies pre-mix concrete to all segments of the construction industry including infrastructure, social, commercial and residential construction.

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

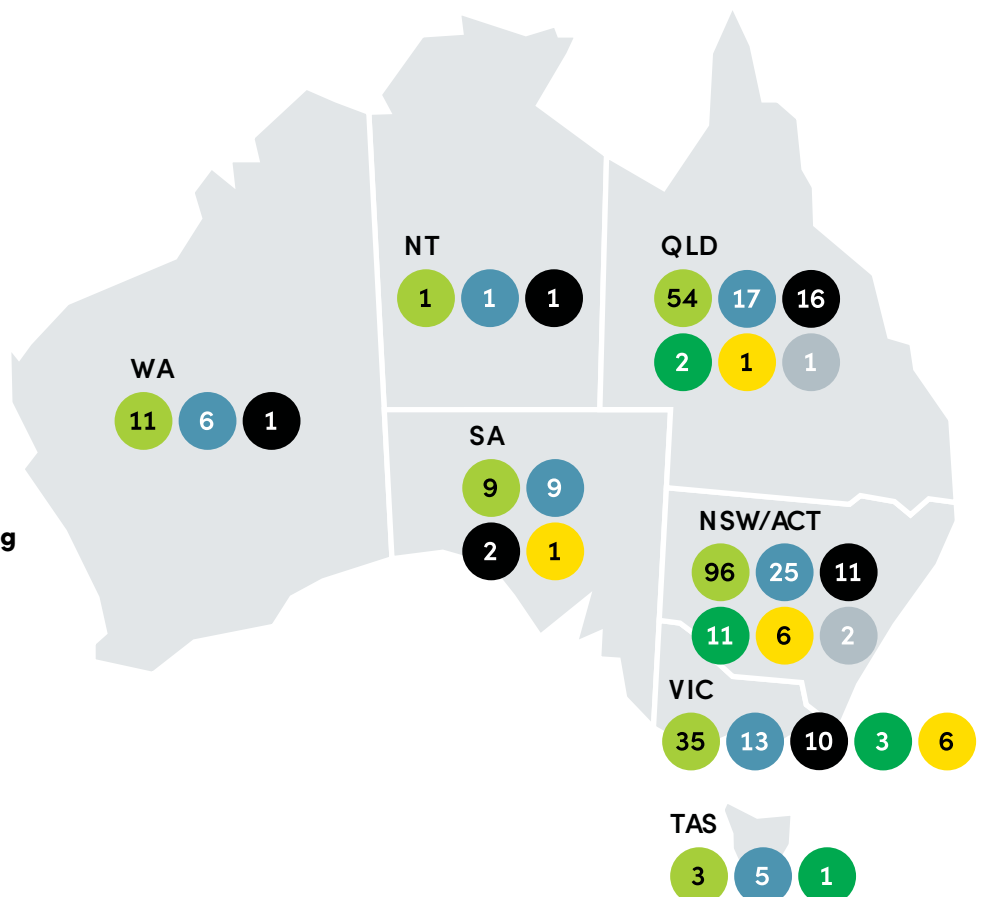
## Construction materials Leading integrated network

# 360

Operating sites\*



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



# About Boral

**ZERO HARM**  
TODAY

## How we work

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

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

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

## Innovation and technical capability

**The Innovation Factory is Boral’s in-house centre of excellence responsible for developing advanced cement and concrete solutions for our customers.**

Through consultation with our customers, the Innovation Factory is central to enabling transformation through innovative products at Boral.

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



# About Boral

## Technical services

**As one of Australia's largest construction materials companies, Boral is committed to excellence, providing customers with quality products and reliable service.**

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

Our aim is to provide products backed up by specialised testing as well as extensive quality control testing and technical support.

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

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

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

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

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

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





# About Boral

## Sustainability at Boral

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

**We strive to:**

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

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

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

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



# About Boral

## ZERO HARM TODAY

### Our commitment

**Our overarching goal is to deliver Zero Harm Today. This means we target zero injuries to our people and seek to eliminate adverse environmental impacts.**

Where elimination is not possible, we seek to minimise any harmful effects from our operations. At an absolute minimum, this means complying with environmental legislation, regulations, standards and codes of practice.

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





# Geographical scope

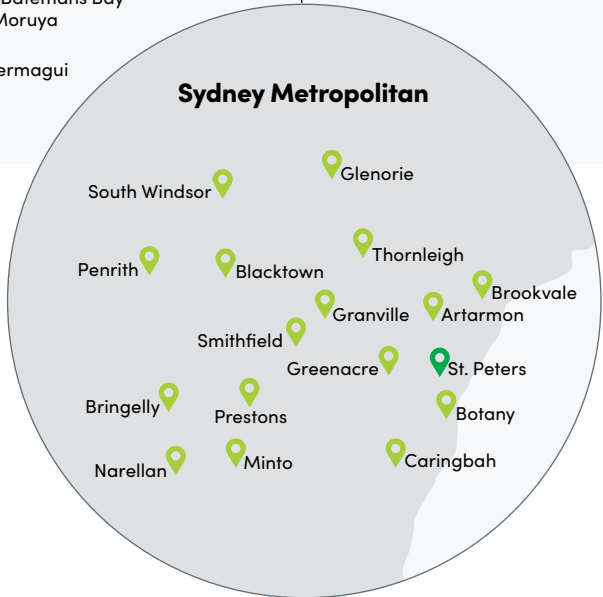
New South Wales / Australian Capital Territory region



**Legend**

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

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



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



# Geographical scope

New South Wales / Australian Capital Territory region



**Boral Concrete St Peters**  
– Sydney, NSW



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






**Boral Concrete Jesmond**  
– Newcastle / Hunter, NSW



**Boral Concrete Mitchell**  
– Canberra, ACT

**Legend**

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

# Declared products

## Products considered for the NSW / ACT region EPD

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

### 1) Normal class concrete products

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

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

### 2) Lower carbon concrete products

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

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

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

## Declared products

### **ENVIROCRETE® concrete (30% and 40%)**

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

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

### **ENVIROCRETE® PLUS concrete**

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

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

### **ENVISIA® concrete**

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

#### **Lower carbon**

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

#### **Workability**

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

#### **Superior engineering properties**

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

#### **Superior durability**

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

#### **Architectural presence**

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

## 3) Concrete products for special applications

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



# Declared products

## Products covered by this Environmental Product Declaration (EPD)

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

### 1) Normal class concrete products

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

### 2) Lower carbon concrete products for special applications

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

### 3) Concrete products for special applications

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

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

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

### 4) Fibrecrete products

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

### 5) Lower carbon fibrecrete products

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

## Pre-mix concrete production

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

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

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



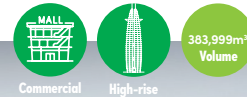


# ENVISIA® Case study



Building something great

## Case study ENVISIA® Concrete



## Crown Sydney – Barangaroo

### Project

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

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

#### Overview

##### Customer

Lend Lease

##### Project name

Crown – Barangaroo

##### Segment

Commercial

##### Location

Sydney CBD, NSW

##### Concrete offered

ENVISIA®  
(flatwork and infills)

#### What was the customer looking for:

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

#### What could Boral offer:

- **Boral supplied a 383,000m<sup>3</sup> total concrete volume** across Barangaroo South.
- **Boral supplied ENVISIA® lower carbon concrete<sup>1</sup> and Green Star 3<sup>2</sup> 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.

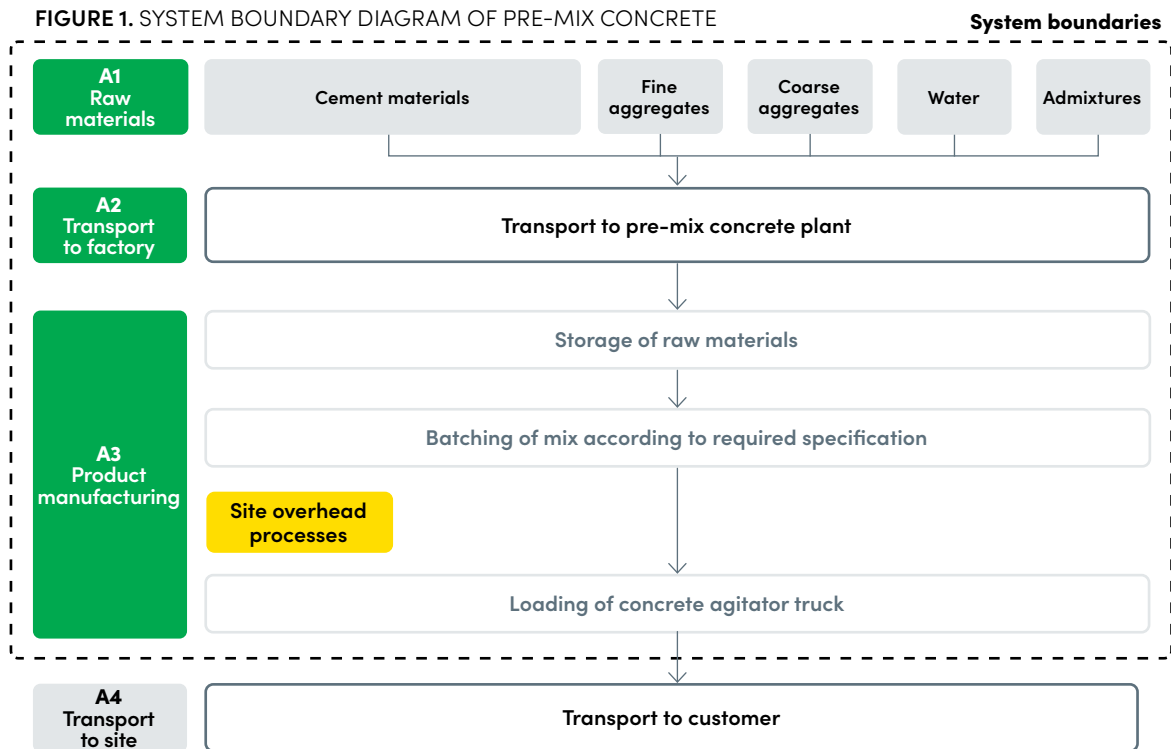
For more information please visit [boral.com.au/lcc](http://boral.com.au/lcc)

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

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



## Raw material stage (A1)

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

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

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

## Transportation stage (A2)

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

**TABLE 1. SCOPE OF EPD**

Product stage			Construction stage		Use stage							End-of-life stage				Benefits beyond system boundary
RAW MATERIAL SUPPLY	TRANSPORT	MANUFACTURING	TRANSPORT	CONSTRUCTION-INSTALLATION PROCESS	USE	MAINTENANCE	REPAIR	REPLACEMENT	REFURBISHMENT	OPERATIONAL ENERGY USE	OPERATIONAL WATER USE	DECONSTRUCTION DEMOLITION	TRANSPORT	WASTE PROCESSING	DISPOSAL	REUSE, RECOVERY, RECYCLING POTENTIAL
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Scenario				Scenario							Scenario					
✓	✓	✓	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

✓ = module is included in this study MND = module is not declared\*

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



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

## Manufacturing stage (A3)

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

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



# Life Cycle Assessment (LCA) methodology

## Background data

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

The NSW quarry data, cement production data and concrete production data have been collected for calendar year 2018. The vast majority of the environmental profiles of our products are based on life cycle data that are less than five years old. Background data used is less than 10 years old.

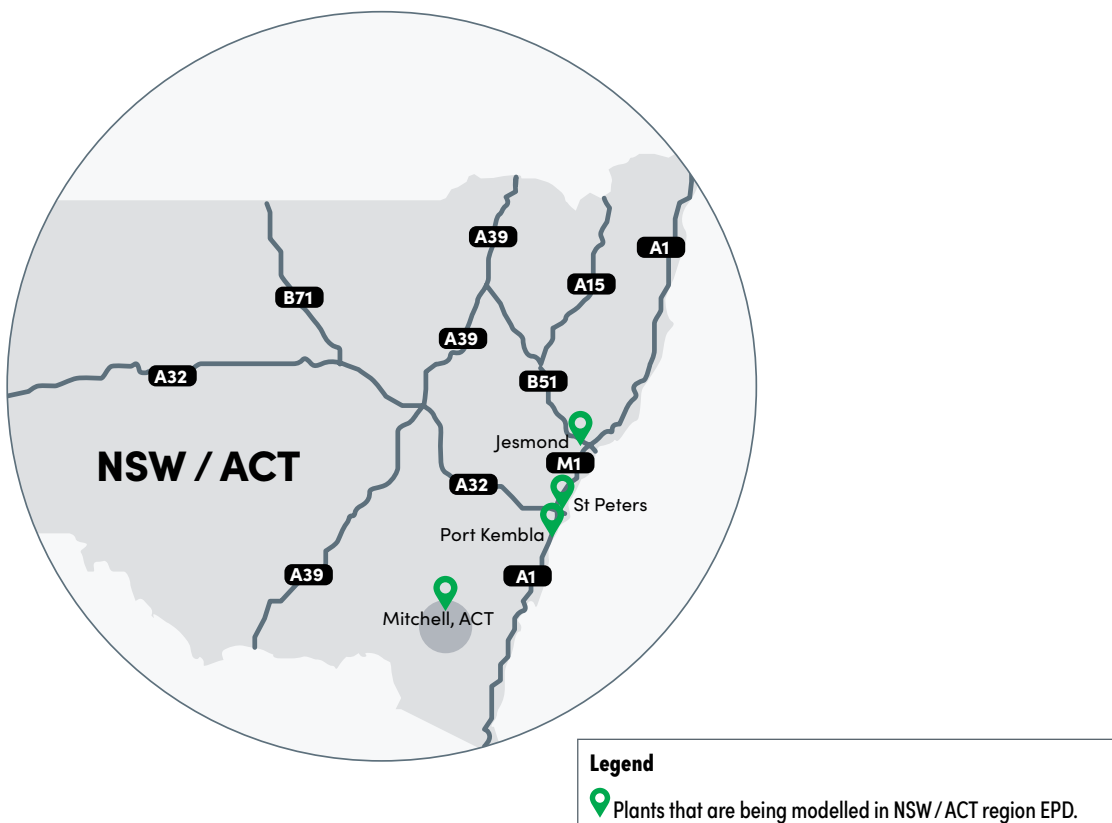
Methodological choices have been applied in line with EN 15804 (CEN 2013); deviations have been recorded.

## Representative plants in each region

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

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

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





# Life Cycle Assessment (LCA) methodology

## Allocation

The key material production processes that require allocation are:

### Pre-mix concrete

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

### Cementitious binders

Electricity use (based on data from Berrima and Maldon) is allocated to each cementitious product based on actual electricity use of the grinding processes.

### Aggregates

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

### Blast Furnace Slag (BFS)

BFS is a by-product from steel-making. We have used the AusLCI data for BFS ('Blast Furnace Slag allocation, at steel plant / AU U'), which contain impacts from pig iron production allocated to blast furnace slag using economic allocation.

### Fly ash

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

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

## Cut-off criteria

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

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

## Key assumptions

### Admixture data

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

### Fly ash

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

### Blast Furnace Slag (BFS)

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

### Water consumption

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

# Product composition

## Content declaration (% by weight)

**TABLE 2. NSW / ACT REGION PRODUCT COMPOSITIONS**

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

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

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

\*May include Zep® technology.

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

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

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

## Declared unit

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

Pre-mix concrete is available in various strength grades and with characteristics that are specifically designed for each application. The declared unit that covers all of the products is: **One cubic metre (m<sup>3</sup>) 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 <sub>2</sub> equivalents
Depletion potential of the stratospheric ozone layer	ODP	kg CFC-11 equivalents
Acidification potential of soil and water	AP	kg SO <sub>2</sub> equivalents
Eutrophication potential	EP	kg PO <sub>4</sub> <sup>3-</sup> equivalents
Photochemical ozone creation potential	POCP	kg C <sub>2</sub> H <sub>4</sub> 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 <sub>NCV</sub>
Use of renewable primary energy resources used as raw materials	PERM	MJ <sub>NCV</sub>
Total use of renewable primary energy resources	PERT	MJ <sub>NCV</sub>
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ <sub>NCV</sub>
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ <sub>NCV</sub>
Total use of non-renewable primary energy resources	PENRT	MJ <sub>NCV</sub>
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ <sub>NCV</sub>
Use of non-renewable secondary fuels	NRSF	MJ <sub>NCV</sub>
Use of net fresh water	FW	m <sup>3</sup>
<b>Waste categories</b>		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
<b>Output flows</b>		
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 m<sup>3</sup> 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<sup>®</sup> 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 m<sup>3</sup> of concrete) to ensure the St Peters results are representative for the wider Sydney region.

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

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



# Sydney region

Environmental profiles and parameters



# Product table list

## Sydney region

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

### Normal class concrete products

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

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

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

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

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

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

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

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

### Lower carbon concrete products

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

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

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

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

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

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

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

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

### Concrete for special applications

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

# Cradle-to-gate GWP-GHG summary (kg CO<sub>2</sub> eq / m<sup>3</sup>)

## Sydney region

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



# Cradle-to-gate GWP-GHG summary (kg CO<sub>2</sub> eq / m<sup>3</sup>)

## Sydney region

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

# Sydney region

**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

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

TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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



# Sydney region

**TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

**TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

# Sydney region

**TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

# Sydney region

**TABLE 9.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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



## Sydney region

**TABLE 11. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

**TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

# Sydney region

**TABLE 13. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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
<b>GWP</b>	<b>kg CO<sub>2</sub> eq.</b>	<b>186</b>	<b>201</b>	<b>217</b>	<b>255</b>	<b>311</b>	<b>347</b>	<b>373</b>
<b>ODP</b>	kg CFC11 eq	2.05E-06	2.09E-06	2.16E-06	2.26E-06	2.50E-06	2.61E-06	2.69E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.327	0.346	0.365	0.413	0.49	0.548	0.578
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0736	0.0783	0.0827	0.0935	0.111	0.124	0.13
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0162	0.0171	0.018	0.0201	0.0241	0.0278	0.0288
<b>ADPE</b>	kg Sb eq	4.27E-06	4.53E-06	3.86E-06	5.09E-06	7.05E-06	1.59E-05	1.39E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1290	1380	1460	1660	2020	2340	2440

**TABLE 14. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

## Sydney region

**TABLE 15.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 16.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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

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
<b>GWP</b>	<b>kg CO<sub>2</sub> eq.</b>	<b>331</b>	<b>324</b>	<b>315</b>	<b>317</b>	<b>367</b>	<b>373</b>
<b>ODP</b>	kg CFC11 eq	2.20E-06	2.15E-06	2.17E-06	2.37E-06	2.52E-06	2.60E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.479	0.471	0.459	0.473	0.537	0.547
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.114	0.112	0.109	0.111	0.127	0.130
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0224	0.0222	0.0215	0.0228	0.0265	0.0274
<b>ADPE</b>	kg Sb eq	8.15E-06	1.01E-05	7.94E-06	1.10E-05	1.64E-05	1.69E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1930	1900	1840	1930	2260	2350

**TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>**

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

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

**TABLE 20.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

Parameter	Unit	TREMIE 40MPa	TREMIE 50MPa	TREMIE 65MPa	SHOTCRETE 40MPa 10MM	SHOTCRETE 40MPa 35KG STEEL FIBRE	KERB MACHINE 25MPa 10MM	KERB MACHINE 32MPa 10MM
<b>PERE</b>	MJ <sub>NCV</sub>	7.00E+01	8.37E+01	9.19E+01	6.95E+01	1.17E+02	5.29E+01	6.04E+01
<b>PERM</b>	MJ <sub>NCV</sub>	9.62E-02	1.11E-01	1.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>PERT</b>	MJ <sub>NCV</sub>	7.01E+01	8.38E+01	9.20E+01	6.95E+01	1.17E+02	5.29E+01	6.04E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.65E+03	2.03E+03	2.26E+03	1.80E+03	2.57E+03	1.42E+03	1.61E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	1.26E+01	1.39E+01	1.40E+01	1.97E+01	1.97E+01	0.00E+00	0.00E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	1.66E+03	2.05E+03	2.28E+03	1.82E+03	2.58E+03	1.42E+03	1.61E+03
<b>SM</b>	kg	2.14E+02	2.04E+02	2.16E+02	1.51E+02	1.82E+02	1.02E+02	8.25E+01
<b>RSF</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E+01	0.00E+00	0.00E+00
<b>NRSF</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.50E+00	0.00E+00	0.00E+00
<b>FW</b>	m <sup>3</sup>	3.08E+00	3.00E+00	2.90E+00	3.01E+00	3.87E+00	3.10E+00	3.09E+00
<b>HWD</b>	kg	4.26E-05	4.42E-05	4.49E-05	2.71E-05	2.86E-02	9.03E-07	4.07E-06
<b>NHWD</b>	kg	6.18E+00	5.86E+00	6.35E+00	2.27E+00	2.33E+01	5.78E-01	6.40E-01
<b>RWD</b>	kg	6.82E-03	6.76E-03	7.13E-03	5.08E-03	6.99E-03	2.11E-04	6.83E-04
<b>CRU</b>	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>MFR</b>	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
<b>MER</b>	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>EE</b>	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 21.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 22.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>303</b>	<b>221</b>	<b>225</b>	<b>237</b>
<b>ODP</b>	kg CFC11 eq	2.27E-06	2.37E-06	2.37E-06	2.43E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.449	0.365	0.380	0.402
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.107	0.0849	0.0870	0.0912
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0212	0.0185	0.0197	0.0212
<b>ADPE</b>	kg Sb eq	8.20E-06	6.37E-06	1.50E-05	2.18E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1800	1500	1560	1670

**TABLE 24.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

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

**TABLE 26.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

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

**TABLE 28. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>**

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

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**TABLE 29.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 30.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

# Sydney region

**TABLE 31. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>**

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

**TABLE 32. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>**

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

# Sydney region

**TABLE 33.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 34.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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



## Sydney region

**TABLE 35.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 36.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

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**TABLE 37.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 38.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

## Sydney region

**TABLE 39.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 40.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

# Sydney region

**TABLE 41. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

**TABLE 42. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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



## Sydney region

**TABLE 43.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 44.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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

# Sydney region

**TABLE 45.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 46.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

## Sydney region

**TABLE 47.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 48.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>

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

# Sydney region

**TABLE 49.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 50.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

## Sydney region

**TABLE 51. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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

**TABLE 52. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SYDNEY (NSW), PER M<sup>3</sup>**

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



# Sydney region

**TABLE 53.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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

**TABLE 54.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SYDNEY (NSW), PER M<sup>3</sup>

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





# Newcastle region

Environmental profiles and parameters



# Product table list

## Newcastle region

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

### Normal class concrete products

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

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

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

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

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

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

### Lower carbon concrete products

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

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

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

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

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

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

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

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

### Concrete for special applications

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

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

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

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

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

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

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

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

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

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

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

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

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

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

# Cradle-to-gate GWP-GHG summary (kg CO<sub>2</sub> eq / m<sup>3</sup>)

## Newcastle region

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

# Cradle-to-gate GWP-GHG summary (kg CO<sub>2</sub> eq / m<sup>3</sup>)

## Newcastle region

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



# Newcastle region

**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>**

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
<b>GWP</b>	<b>kg CO<sub>2</sub> eq.</b>	<b>259</b>	<b>275</b>	<b>301</b>	<b>344</b>	<b>438</b>
<b>ODP</b>	kg CFC11 eq	2.36E-06	2.41E-06	2.46E-06	2.55E-06	2.79E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.377	0.398	0.428	0.480	0.594
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0894	0.0945	0.102	0.115	0.143
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0191	0.0200	0.0214	0.0236	0.0287
<b>ADPE</b>	kg Sb eq	3.66E-06	3.78E-06	4.16E-06	4.98E-06	6.25E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1510	1600	1740	1960	2460

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>**

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

# Newcastle region

**TABLE 3. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>**

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
<b>GWP</b>	<b>kg CO<sub>2</sub> eq.</b>	<b>195</b>	<b>217</b>	<b>246</b>	<b>319</b>	<b>404</b>
<b>ODP</b>	kg CFC11 eq	2.23E-06	2.28E-06	2.35E-06	2.52E-06	2.74E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.302	0.328	0.364	0.451	0.554
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0709	0.0772	0.0860	0.107	0.133
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0159	0.0170	0.0186	0.0224	0.0270
<b>ADPE</b>	kg Sb eq	3.51E-06	3.65E-06	4.04E-06	4.92E-06	6.17E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1190	1300	1460	1840	2290

**TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>**

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

# Newcastle region

**TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>**

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>185</b>	<b>196</b>	<b>214</b>	<b>243</b>	<b>308</b>
<b>ODP</b>	kg CFC11 eq	3.10E-06	3.20E-06	3.33E-06	3.55E-06	4.08E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.455	0.481	0.520	0.585	0.729
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0793	0.0837	0.0901	0.101	0.125
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0216	0.0226	0.0242	0.0269	0.0329
<b>ADPE</b>	kg Sb eq	3.56E-06	3.67E-06	4.04E-06	4.84E-06	6.07E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1330	1410	1530	1720	2150

**TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>**

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

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

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>**

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

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

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>

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

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

**TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>**

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

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

**TABLE 14.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NEWCASTLE (NSW), PER M<sup>3</sup>

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

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>330</b>	<b>318</b>	<b>310</b>	<b>421</b>	<b>465</b>	<b>481</b>
<b>ODP</b>	kg CFC11 eq	2.78E-06	2.52E-06	2.52E-06	2.71E-06	2.81E-06	3.15E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.478	0.447	0.438	0.572	0.637	0.687
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.113	0.107	0.105	0.137	0.150	0.159
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0241	0.0222	0.0218	0.0281	0.0314	0.0398
<b>ADPE</b>	kg Sb eq	8.10E-06	2.73E-06	2.68E-06	6.21E-06	1.43E-05	6.97E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1920	1820	1780	2380	2640	2790

**TABLE 16.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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

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

**TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>**

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

# Newcastle region

**TABLE 19.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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

**TABLE 20.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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



# Newcastle region

**TABLE 21.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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

**TABLE 22.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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

# Newcastle region

**TABLE 23.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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

**TABLE 24.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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

## Newcastle region

**TABLE 25.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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

**TABLE 26.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>

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

# Newcastle region

**TABLE 27. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>**

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

**TABLE 28. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NEWCASTLE (NSW), PER M<sup>3</sup>**

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





# Wollongong region

Environmental profiles and parameters



# Product table list

## Wollongong region

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

### Normal class concrete products

#### Table No. 1 and 2 .....67

- 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 18 .....75

- 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 .....76

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

#### Table No. 21 and 22 .....77

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

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

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

#### Table No. 25 and 26 .....79

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

#### Table No. 27 and 28 ..... 80

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

#### Table No. 29 and 30 ..... 81

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

# Cradle-to-gate GWP-GHG summary (kg CO<sub>2</sub> eq / m<sup>3</sup>)

## Wollongong region

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

# Cradle-to-gate GWP-GHG summary (kg CO<sub>2</sub> eq / m<sup>3</sup>)

## Wollongong region

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

# Wollongong region

**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>**

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>263</b>	<b>280</b>	<b>306</b>	<b>348</b>	<b>442</b>
<b>ODP</b>	kg CFC11 eq	2.95E-06	3.01E-06	3.08E-06	3.21E-06	3.56E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.403	0.423	0.453	0.503	0.616
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0947	0.0997	0.107	0.119	0.147
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0222	0.0231	0.0245	0.0267	0.0319
<b>ADPE</b>	kg Sb eq	2.29E-06	2.43E-06	2.65E-06	3.02E-06	3.65E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1570	1660	1800	2020	2520

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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
<b>GWP</b>	<b>kg CO<sub>2</sub> eq.</b>	<b>202</b>	<b>223</b>	<b>253</b>	<b>325</b>	<b>411</b>
<b>ODP</b>	kg CFC11 eq	3.04E-06	3.07E-06	3.16E-06	3.42E-06	3.73E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.338	0.362	0.397	0.484	0.587
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0783	0.0843	0.0929	0.114	0.140
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0195	0.0205	0.0221	0.0261	0.0308
<b>ADPE</b>	kg Sb eq	2.15E-06	2.30E-06	2.53E-06	2.97E-06	3.58E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1280	1380	1540	1920	2370

**TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>184</b>	<b>195</b>	<b>212</b>	<b>240</b>	<b>303</b>
<b>ODP</b>	kg CFC11 eq	2.90E-06	2.95E-06	3.02E-06	3.14E-06	3.46E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.320	0.334	0.355	0.391	0.472
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0732	0.0766	0.0817	0.090	0.110
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0192	0.0199	0.0209	0.0226	0.0266
<b>ADPE</b>	kg Sb eq	2.19E-06	2.33E-06	2.54E-06	2.89E-06	3.48E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1260	1330	1430	1600	1970

**TABLE 6.** ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>

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

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>145</b>	<b>159</b>	<b>181</b>	<b>251</b>	<b>370</b>
<b>ODP</b>	kg CFC11 eq	3.05E-06	3.11E-06	3.21E-06	3.39E-06	3.65E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.283	0.301	0.330	0.411	0.548
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0630	0.0674	0.0742	0.0943	0.129
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0176	0.0185	0.0199	0.0235	0.0296
<b>ADPE</b>	kg Sb eq	4.03E-06	4.34E-06	4.82E-06	5.66E-06	7.90E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1060	1140	1280	1630	2230

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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

**TABLE 10. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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

**TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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

**TABLE 14. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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

**TABLE 16. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>333</b>	<b>324</b>	<b>316</b>	<b>422</b>	<b>491</b>	<b>521</b>
<b>ODP</b>	kg CFC11 eq	3.35E-06	3.30E-06	3.26E-06	3.71E-06	3.93E-06	4.07E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.495	0.480	0.469	0.604	0.689	0.746
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.116	0.113	0.111	0.143	0.164	0.175
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0266	0.0259	0.0255	0.0318	0.0360	0.0399
<b>ADPE</b>	kg Sb eq	5.25E-06	3.07E-06	3.07E-06	9.06E-06	1.06E-05	2.68E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1960	1910	1870	2470	2840	3120

**TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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

**TABLE 20. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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

**TABLE 22. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M<sup>3</sup>**

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

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>308</b>	<b>315</b>	<b>324</b>	<b>344</b>
<b>ODP</b>	kg CFC11 eq	3.44E-06	3.55E-06	3.56E-06	3.65E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.473	0.483	0.503	0.535
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.110	0.113	0.116	0.123
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0257	0.0264	0.0279	0.0298
<b>ADPE</b>	kg Sb eq	8.27E-06	6.50E-06	1.51E-05	2.19E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1870	1900	2000	2140

**TABLE 24.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M<sup>3</sup>

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

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

**TABLE 26.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M<sup>3</sup>

Parameter	Unit	TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND MACHINE / PLACED	TfNSW R83 35 MPa HAND MACHINE / PLACED
<b>PERE</b>	Mj <sub>NCV</sub>	8.31E+01	2.58E+01	5.45E+01
<b>PERM</b>	Mj <sub>NCV</sub>	2.40E-02	0.00E+00	0.00E+00
<b>PERT</b>	Mj <sub>NCV</sub>	8.31E+01	2.58E+01	5.45E+01
<b>PENRE</b>	Mj <sub>NCV</sub>	2.40E+03	8.15E+02	1.70E+03
<b>PENRM</b>	Mj <sub>NCV</sub>	2.05E+01	4.10E+00	2.19E+00
<b>PENRT</b>	Mj <sub>NCV</sub>	2.42E+03	8.20E+02	1.70E+03
<b>SM</b>	kg	1.70E+02	1.69E+02	1.14E+02
<b>RSF</b>	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
<b>NRSF</b>	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
<b>FW</b>	m <sup>3</sup>	2.88E+00	3.09E+00	3.05E+00
<b>HWD</b>	kg	3.10E-05	8.49E-06	4.75E-06
<b>NHWD</b>	kg	2.46E+00	6.41E-01	1.04E+00
<b>RWD</b>	kg	5.34E-03	1.50E-03	9.72E-04
<b>CRU</b>	kg	0.00E+00	0.00E+00	0.00E+00
<b>MFR</b>	kg	9.60E+01	9.60E+01	9.60E+01
<b>MER</b>	kg	0.00E+00	0.00E+00	0.00E+00
<b>EE</b>	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 M<sup>3</sup>**

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

**TABLE 28. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, WOLLONGONG (NSW), PER M<sup>3</sup>**

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





# Canberra region

Environmental profiles and parameters



# Product table list

## Canberra region

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

### Normal class concrete products

#### Table No. 1 and 2 ..... 85

- NORMAL CLASS GP BLEND 20 MP<sub>a</sub>
- NORMAL CLASS GP BLEND 25 MP<sub>a</sub>
- NORMAL CLASS GP BLEND 32 MP<sub>a</sub>
- NORMAL CLASS GP BLEND 40 MP<sub>a</sub>
- NORMAL CLASS GP BLEND 50 MP<sub>a</sub>

#### Table No. 3 and 4 ..... 86

- NORMAL CLASS GP / FA BLEND 20 MP<sub>a</sub>
- NORMAL CLASS GP / FA BLEND 25 MP<sub>a</sub>
- NORMAL CLASS GP / FA BLEND 32 MP<sub>a</sub>
- NORMAL CLASS GP / FA BLEND 40 MP<sub>a</sub>
- NORMAL CLASS GP / FA BLEND 50 MP<sub>a</sub>

#### Table No. 5 and 6 ..... 87

- NORMAL CLASS GP / GGBFS BLEND 20 MP<sub>a</sub>
- NORMAL CLASS GP / GGBFS BLEND 25 MP<sub>a</sub>
- NORMAL CLASS GP / GGBFS BLEND 32 MP<sub>a</sub>
- NORMAL CLASS GP / GGBFS BLEND 40 MP<sub>a</sub>
- NORMAL CLASS GP / GGBFS BLEND 50 MP<sub>a</sub>

### Lower carbon concrete products

#### Table No. 7 and 8 ..... 88

- ENVIROCRETE® 30% 20 MP<sub>a</sub>
- ENVIROCRETE® 30% 25 MP<sub>a</sub>
- ENVIROCRETE® 30% 32 MP<sub>a</sub>
- ENVIROCRETE® 30% 40 MP<sub>a</sub>
- ENVIROCRETE® 30% 50 MP<sub>a</sub>

#### Table No. 9 and 10 ..... 89

- ENVIROCRETE® 40% 20 MP<sub>a</sub>
- ENVIROCRETE® 40% 25 MP<sub>a</sub>
- ENVIROCRETE® 40% 32 MP<sub>a</sub>
- ENVIROCRETE® 40% 40 MP<sub>a</sub>
- ENVIROCRETE® 40% 50 MP<sub>a</sub>

#### Table No. 11 and 12 ..... 90

- ENVIROCRETE® PLUS 20 MP<sub>a</sub>
- ENVIROCRETE® PLUS 25 MP<sub>a</sub>
- ENVIROCRETE® PLUS 32 MP<sub>a</sub>
- ENVIROCRETE® PLUS 40 MP<sub>a</sub>
- ENVIROCRETE® PLUS 50 MP<sub>a</sub>

#### Table No. 13 and 14 ..... 91

- ENVISIA® 20 MP<sub>a</sub>
- ENVISIA® 25 MP<sub>a</sub>
- ENVISIA® 32 MP<sub>a</sub>
- ENVISIA® 40 MP<sub>a</sub>
- ENVISIA® 50 MP<sub>a</sub>
- ENVISIA® 65 MP<sub>a</sub>

### Concrete for special applications

#### Table No 15 and 16 ..... 92

- POST TENSIONED 40 MP<sub>a</sub> 22@3
- POST TENSIONED 40 MP<sub>a</sub> 22@4
- POST TENSIONED 40 MP<sub>a</sub> 22@5
- HIGH SLUMP 50 MP<sub>a</sub>
- HIGH SLUMP 65 MP<sub>a</sub>
- HIGH SLUMP 80 MP<sub>a</sub>

#### Table No. 17 and 18 ..... 93

- TREMIE 40 MP<sub>a</sub>
- TREMIE 50 MP<sub>a</sub>
- TREMIE 65 MP<sub>a</sub>
- SHOTCRETE 40 MP<sub>a</sub>
- KERB MACHINE 25 MP<sub>a</sub>
- KERB MACHINE 32 MP<sub>a</sub>

#### Table No. 19 and 20 ..... 94

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

#### Table No. 21 and 22 ..... 95

- TfNSW B80 40 MP<sub>a</sub> PUMP B1 EXPOSURE
- TfNSW B80 40 MP<sub>a</sub> PUMP B2 EXPOSURE
- TfNSW B80 40 MP<sub>a</sub> TREMIE B2 EXPOSURE
- TfNSW B80 50 MP<sub>a</sub> TREMIE CFA C1 EXPOSURE

#### Table No. 23 and 24 ..... 96

- TfNSW B80 50 MP<sub>a</sub> TREMIE B2 EXPOSURE
- TfNSW R82 5 MP<sub>a</sub> HAND / MACHINE PLACED
- TfNSW R83 35 MP<sub>a</sub> HAND / MACHINE PLACED

#### Table No. 25 and 26 ..... 97

- BLOCKFILL 20MP<sub>a</sub> GP/FA BLEND
- BLOCKFILL 25MP<sub>a</sub> GP/FA BLEND
- BLOCKFILL32MP<sub>a</sub> GP/FA BLEND
- BLOCKFILL40MP<sub>a</sub> GP/FA BLEND

# Cradle-to-gate GWP-GHG summary (kg CO<sub>2</sub> eq / m<sup>3</sup>)

## Canberra region

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



# Cradle-to-gate GWP-GHG summary (kg CO<sub>2</sub> eq / m<sup>3</sup>)

## Canberra region

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

# Canberra region

**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>**

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>266</b>	<b>283</b>	<b>309</b>	<b>352</b>	<b>447</b>
<b>ODP</b>	kg CFC11 eq	3.35E-06	3.45E-06	3.48E-06	3.68E-06	4.15E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.413	0.435	0.463	0.517	0.635
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0964	0.102	0.109	0.122	0.151
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0225	0.0236	0.0248	0.0272	0.0327
<b>ADPE</b>	kg Sb eq	2.17E-06	2.25E-06	2.76E-06	3.13E-06	3.82E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1610	1710	1840	2080	2590

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>**

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

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
<b>GWP</b>	<b>kg CO<sub>2</sub> eq.</b>	<b>207</b>	<b>228</b>	<b>258</b>	<b>331</b>	<b>418</b>
<b>ODP</b>	kg CFC11 eq	3.68E-06	3.73E-06	3.78E-06	4.16E-06	4.58E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.358	0.382	0.416	0.508	0.616
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0819	0.0879	0.0965	0.119	0.145
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0204	0.0215	0.0230	0.0273	0.0323
<b>ADPE</b>	kg Sb eq	2.03E-06	2.12E-06	2.64E-06	3.08E-06	3.75E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1340	1450	1610	2010	2470

**TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>**

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

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>190</b>	<b>202</b>	<b>219</b>	<b>249</b>	<b>314</b>
<b>ODP</b>	kg CFC11 eq	3.39E-06	3.49E-06	3.52E-06	3.73E-06	4.22E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.354	0.372	0.394	0.437	0.533
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0765	0.0804	0.0855	0.0950	0.116
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0206	0.0214	0.0224	0.0246	0.0293
<b>ADPE</b>	kg Sb eq	2.15E-06	2.23E-06	2.74E-06	3.10E-06	3.79E-06
<b>ADPF</b>	Mj <sub>NCV</sub>	1350	1430	1530	1720	2130

**TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>**

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

# Canberra region

**TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>**

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

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>**

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

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

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>

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

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

**TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>**

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

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

**TABLE 14.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CANBERRA (ACT), PER M<sup>3</sup>

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

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
<b>GWP</b>	<b>kg CO<sub>2</sub> eq.</b>	<b>367</b>	<b>365</b>	<b>366</b>	<b>430</b>	<b>485</b>	<b>512</b>
<b>ODP</b>	kg CFC11 eq	3.85E-06	3.75E-06	3.79E-06	4.70E-06	4.85E-06	4.93E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.546	0.533	0.538	0.638	0.715	0.758
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.128	0.126	0.127	0.150	0.167	0.176
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0292	0.0280	0.0284	0.0339	0.0378	0.0404
<b>ADPE</b>	kg Sb eq	9.14E-06	3.18E-06	4.72E-06	9.28E-06	1.89E-05	2.29E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	2220	2140	2160	2580	2920	3140

**TABLE 16.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>

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

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

**TABLE 18. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>**

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



# Canberra region

**TABLE 19.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>

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

**TABLE 20.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>

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

## Canberra region

**TABLE 21.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>

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
<b>GWP</b>	kg CO <sub>2</sub> eq.	<b>315</b>	<b>322</b>	<b>331</b>	<b>352</b>
<b>ODP</b>	kg CFC11 eq	4.37E-06	4.35E-06	4.43E-06	4.66E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.506	0.51	0.533	0.569
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.116	0.118	0.122	0.129
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0277	0.0277	0.0295	0.0317
<b>ADPE</b>	kg Sb eq	8.57E-06	6.85E-06	1.54E-05	2.21E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1970	2000	2100	2260

**TABLE 22.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>

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

# Canberra region

**TABLE 23.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>

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

**TABLE 24.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>

Parameter	Unit	TfNSW B80 50 MPa PUMP B2 EXPOSURE	TfNSW R82 5 MPa HAND MACHINE / PLACED	TfNSW R83 35 MPa HAND MACHINE / PLACED
<b>PERE</b>	MJ <sub>NCV</sub>	8.05E+01	2.15E+01	5.32E+01
<b>PERM</b>	MJ <sub>NCV</sub>	2.40E-02	0.00E+00	0.00E+00
<b>PERT</b>	MJ <sub>NCV</sub>	8.06E+01	2.15E+01	5.32E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	2.51E+03	8.95E+02	1.79E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	2.05E+01	2.19E+00	2.19E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	2.53E+03	8.97E+02	1.79E+03
<b>SM</b>	kg	1.39E+02	1.69E+02	1.14E+02
<b>RSF</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
<b>NRSF</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
<b>FW</b>	m <sup>3</sup>	3.00E+00	3.19E+00	3.13E+00
<b>HWD</b>	kg	3.10E-05	2.95E-06	4.75E-06
<b>NHWD</b>	kg	2.44E+00	3.11E-01	1.02E+00
<b>RWD</b>	kg	5.34E-03	5.49E-04	9.72E-04
<b>CRU</b>	kg	0.00E+00	0.00E+00	0.00E+00
<b>MFR</b>	kg	9.60E+01	9.60E+01	9.60E+01
<b>MER</b>	kg	0.00E+00	0.00E+00	0.00E+00
<b>EE</b>	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 M<sup>3</sup>

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

**TABLE 26.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CANBERRA (ACT), PER M<sup>3</sup>

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

# Other environmental information

## Water management

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

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

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

## Waste and recycling

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

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

## Biodiversity management

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

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

# Our approach to climate related risks

## Our approach

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

Looking at how Boral’s carbon emissions are tracking relative to 2005 levels, in Australia we have reduced emissions by around 40% since FY2005. We achieved about half of this decrease largely by realigning our portfolio away from emissions-intensive businesses. The remainder of the decrease is due to reducing clinker manufacturing in Australia in favour of importing it from more efficient and larger scale operations in Asia. Including Boral North America, our Scope 1 and 2 emissions decreased by 43% since FY2005. We continue to progressively adopt the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). In FY2019, we enhanced our climate-related governance and risk management, completed scenario analysis of Boral Cement’s business and continued to strengthen our resilience to a 2°C scenario. We also broadened our reporting of physical climate-related risks and Scope 3 emissions.

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





# Our approach to climate related risks

## Energy and climate policy

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

### **We support:**

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

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

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

**Boral acknowledges the Paris Agreement and supports mechanisms to achieve its objectives, including a national approach to climate and energy policy. The industry Associations representing the Concrete and Cement industries are:**

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

# References

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## **AS 3582.1**

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## **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**

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## **ACLCA 2019**

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*ACLCA Guidance to Calculating Non-LCIA Inventory  
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## **CEN 2013**

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## **Environdec 2020b**

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## **ISO 2006b**

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