



Building something great

# Pre-mix concrete EPD

Environmental Product Declaration

Queensland (QLD) region



**In accordance with ISO 14025 and EN 15804**

An EPD should provide current information and may be updated if conditions change.

The stated validity is therefore subject to the continued registration and publication at [www.epd-australasia.com](http://www.epd-australasia.com)

EPD Registration Number S-P-02339 (Version 1.2)

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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.

<p><b>Declaration owner</b></p>		<p><b>Boral</b></p>	<p><b>Address</b> Level 3, Triniti 2, 39 Delhi Road, North Ryde NSW 2113 <b>W</b> <a href="http://www.boral.com.au">www.boral.com.au</a> <b>T</b> +61 2 9220 6300</p>
<p><b>EPD program operator</b></p>		<p><b>EPD Australasia Limited</b></p>	<p><b>Address:</b> 315a Hardy Street, Nelson 7010, New Zealand <b>W</b> <a href="http://www.epd-australasia.com">www.epd-australasia.com</a> <b>T</b> +61 2 8005 8206 <b>E</b> <a href="mailto:info@epd-australasia.com">info@epd-australasia.com</a></p>
<p><b>EPD produced by</b></p>		<p><b>Rob Rouwette, start2see</b></p>	<p><b>Address:</b> 36 Renaissance Boulevard Mernda Vic 3754, Australia <b>W</b> <a href="http://www.start2see.com.au">www.start2see.com.au</a> <b>T</b> +61 403 834 470 <b>E</b> <a href="mailto:Rob.Rouwette@start2see.com.au">Rob.Rouwette@start2see.com.au</a></p>
<p><b>Third Party Verifier accredited or approved by EPD Australasia Ltd.</b></p>		<p><b>Andrew D. Moore, Life Cycle Logic</b></p>	<p><b>Address:</b> PO Box 571, Fremantle WA 6959, Australia <b>W</b> <a href="http://www.lifecyclelogic.com.au">www.lifecyclelogic.com.au</a> <b>T</b> +61 4 2432 0057 <b>E</b> <a href="mailto:andrew@lifecyclelogic.com.au">andrew@lifecyclelogic.com.au</a></p>

# Program information and verification

EPD version:	Description of the changes
Version 1.1	<p>The following edits were made as part of the first annual review.</p> <ul style="list-style-type: none"> <li>• Address for Boral has been updated.</li> <li>• The map showing the number of operating sites has been updated.</li> <li>• Organisation acronyms have been changed (ISC etc).</li> <li>• The branding was updated.</li> <li>• Minor discrepancies between the GWP summary tables and results tables have been corrected. In all relevant instances, the incorrect values in the GWP summary tables were 1kg CO<sub>2</sub>e / m<sup>3</sup> higher than the corresponding results tables.</li> </ul>
Version 1.2	<ul style="list-style-type: none"> <li>• The normal GP / FA and ENVIROCRETE® products have been renamed to ENVIROCRETE® 30% and ENVIROCRETE® 40%.</li> </ul>
Reference year for data:	2018-01-01/2018-12-31

## CEN standard EN 15804 served as the core PCR

PCR	<p>PCR 2012:01 Construction Products and Construction Services, Version 2.33, 2020-09-18</p> <p>PCR 2012:01-SUB-PCR-G Concrete and concrete elements, 2020-09-18</p>
PCR review was conducted by	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via <a href="mailto:info@environdec.com">info@environdec.com</a>
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. We also manufacture and supply a range of building products.

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

In Queensland, 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 Queensland.

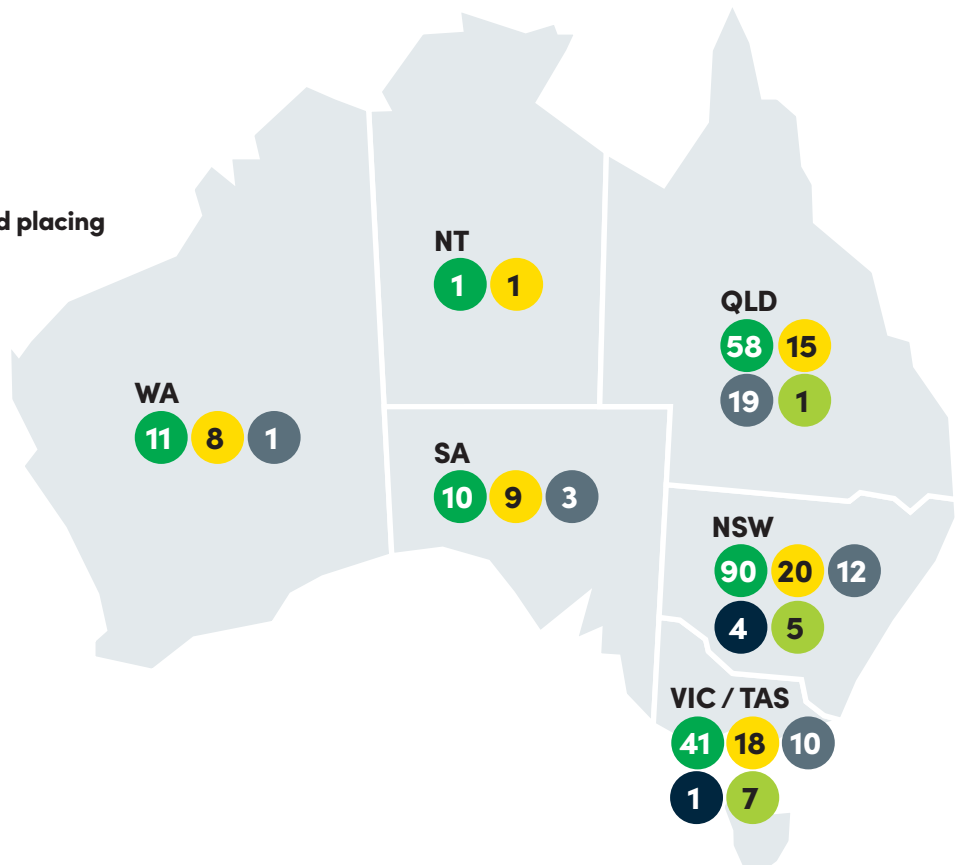
## Construction materials Leading integrated network

# 345

Operating sites\*

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

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



# About Boral

## How we work

**ZERO HARM**  
TODAY

**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

## Queensland region



The concrete plants considered for this Environmental Product Declaration comprise those in the state of Queensland. Individual plants were assessed for life cycle assessment, and local surrounding similar raw material sources were included in the datasets. These modelled plants, including geographically nearby plants are listed in the following location maps.

### Plants covered by this EPD

- Boral Concrete Brisbane – **Eagle Farm**
- Boral Concrete Brisbane South and Gold Coast – **Cleveland**
- Boral Concrete Darling Downs – **Toowoomba**
- Boral Concrete Central Qld – **Hervey Bay**
- Boral Concrete Sunshine Coast – **Maroochydore**
- Boral Concrete Townsville – **Garbutt**
- Boral Concrete North Qld – **Cairns**

### Legend

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

# Geographical scope

Queensland region



**Brisbane, QLD**






**Brisbane South and Gold Coast, QLD**

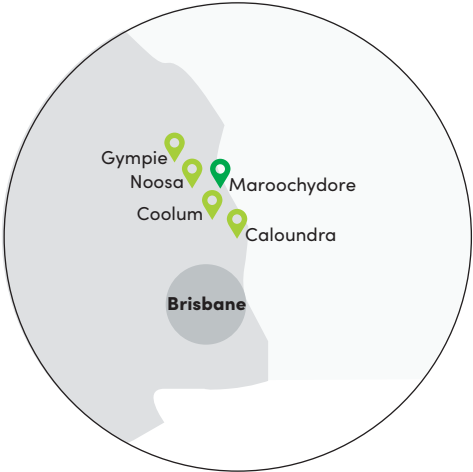


**Darling Downs, QLD**

**Legend**

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

# Geographical scope



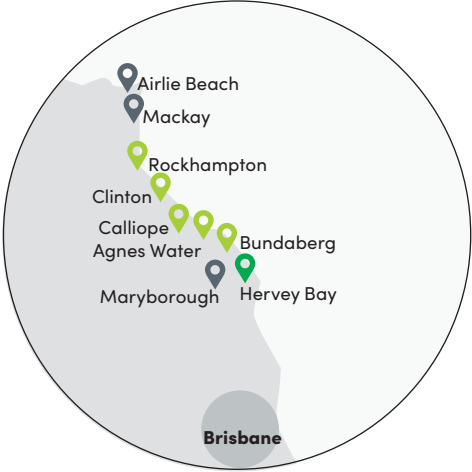
Sunshine Coast, QLD



Townsville, QLD






North Queensland



Central Queensland

**Legend**

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

# Declared products

## Products considered for the QLD 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

### 2) Lower carbon concrete products

**Lower carbon concrete products have been designed to have lower portland cement contents and lower embodied carbon contents.** The lower carbon concrete products 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> <li>Applicable for Green Star Projects.</li> </ul>
ENVIROCRETE® 40%	≥40%	<ul style="list-style-type: none"> <li>Complies with AS 1379.</li> <li>Applicable for Green Star projects.</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%)**

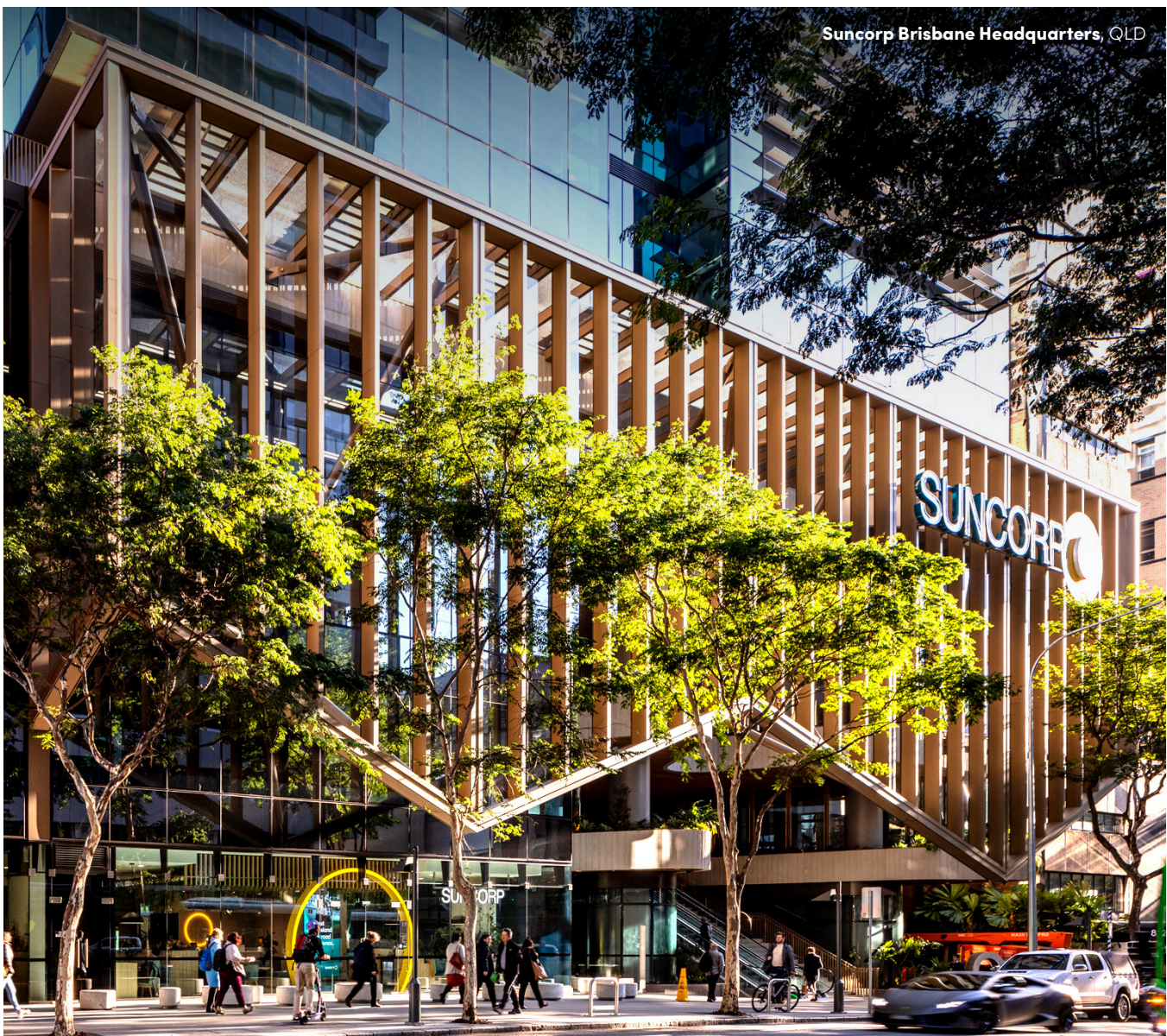
**Boral's ENVIROCRETE® concrete is a lower carbon concrete product which complies with AS 1379.**

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®.



Suncorp Brisbane Headquarters, QLD

# Declared products

## 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. 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 percent greater flexural strength compared to conventional concrete of the same grade.
- ENVISIA® achieves up to 50 percent reduction in shrinkage when compared to conventional sustainable concrete mixes. The low shrinkage of ENVISIA® will allow for more engineering options such as the design of larger slabs with fewer joints.

### 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 off-form finish and lighter colour.
- ENVISIA®'s lighter colour will enhance the use of coloured oxides.



# Declared products

## 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.

## 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 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

### 2) Lower carbon concrete products

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

### 3) Concrete products for special applications

- TMR MRTS70 / 40 MPa 20mm PUMP B1 EXPOSURE
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE
- TMR MRTS70 / 40 MPa 20mm PUMP / TREMIE B2 EXPOSURE
- TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
- TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE
- ASPIRE® 40 GPa – 65 MPa
- ASPIRE® 45 GPa – 80 MPa
- ASPIRE® 50 GPa – 100 MPa
- HIGH SLUMP 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- HIGH SLUMP 80 MPa
- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- SHOTCRETE 32 MPa
- KERB MACHINE 280kg
- KERB MACHINE 320kg
- LEAN MIX 20:1
- NO FINES 6:1



## 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.**

A batching plant stores the ingredients in cement silos, aggregate bins and admixture tanks. The plants use calibrated weigh scales and flow meters to accurately weigh the ingredients which are then mixed in a mixer compliant with item C3 of AS 1379. Most concrete plants mix the concrete in a transit mixer (concrete truck) which then delivers the concrete to the project. However, some plants use a stationary mixer before discharging the mixed concrete into a concrete truck which then delivers the concrete 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.



**"A batching plant stores the ingredients in cement silos, aggregate bins and admixture tank."**

# ENVISIA® case study



**Building something great**

## Case study

# ENVISIA® / ASPIRE® Concrete

### Overview

#### Customer

Mirvac Group contract through East Coast Concrete Contractors

#### Project name

80 Ann Street

#### Segment

Commercial

#### Location

Brisbane CBD, Queensland

#### Concrete / Volume

ENVISIA® (Flatwork and Infills)

ASPIRE® (Vertical elements)



SEGMENT  
COMMERCIAL

VOLUME  
45,000m<sup>3</sup>

## Mirvac – 80 Ann Street, Brisbane Queensland

### Project

80 Ann Street is a 35 Level, 60,000m<sup>2</sup> premium office building in Brisbane's CBD with dual frontage to Turbot and Ann Street. Supply commenced late 2019 and to date, Boral has supplied over 45,000m<sup>3</sup> of ENVISIA® and ASPIRE® mixes.

#### What was the customer looking for:

- The leasing client (Suncorp) insisted on using suppliers that would help achieve a 6-Star rating (the first for Brisbane).
- Mirvac wanted lower carbon construction materials in line with their corporate sustainability commitments.
- Design shrinkage maximum 600 microstrain.
- Good early age strength to ensure the program wasn't impacted.

#### What could Boral offer:

- Historical performance with ASPIRE® on the 300 George project opened the conversation, which led to ENVISIA® discussions, and then finally to securing the work through the placer – East Coast Concrete Contractors.
- ENVISIA® – drying shrinkage nominal 400–550 microstrain @56 days and minimum portland cement reduction of 50% compared with Green Building Council of Australia reference case.
- ASPIRE® – very high strength mixes, with high modulus of elasticity and low shrinkage, and lower overall Portland Cement compared to equivalent high strength.

#### Customer benefit

- Using ENVISIA® and ASPIRE® instead of conventional concrete significantly reduced the buildings carbon footprint.
- Core Filled Tube (CFT) Columns: ASPIRE® 50 pumped from bottom, 4 inch inlet, 20m tall x 1.8m diameter CFT columns. 36m<sup>3</sup> approximately to fill each. Pump operators reported nil increase in pump pressure when constant supply maintained, ASPIRE® mix performed well with no issues over the 18 CFT Columns.
- Improved program efficiency and reduced timeline stress and costs. ASPIRE® has high early strength and low shrinkage was maintained with a high supplementary cementitious materials replacement for Green Star. Conventional jump climbs normally scheduled at minimum three days, with Aspire® not a single pour failed to reach one day strength in time. Jumps climbed on day one or two.
- Early strength on the ENVISIA® for decks allowed final stress of PT to be completed on day two or three, in some cases an initial stress in the morning and final in the afternoon.

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

Boral, the Boral logo and ENVISIA® are trade marks or registered trade marks of Boral Limited or one of its subsidiaries. 17632 03/23

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# ENVISIA® case study



Building  
something  
great

## Case study

# ENVISIA® / ASPIRE® Concrete

## Testimonials

Superior performance backed up by Qld's Best Service. Both innovative products delivered higher technical performance than required and is now a go to product across our business. A huge thanks to the team at Boral!

Conan Butler,  
**East Coast Concrete Contractors**

We were impressed by the early strengths we achieved through the Boral ENVISA and Aspire mix, which has provided a number of key program benefits. The 450 micro-strain achieved on the column load also allowed for significantly lower axial shortening, which improved the differential long-term deflection of the slab.

Trent Boatwright,  
**Senior Project Manager, Mirvac**

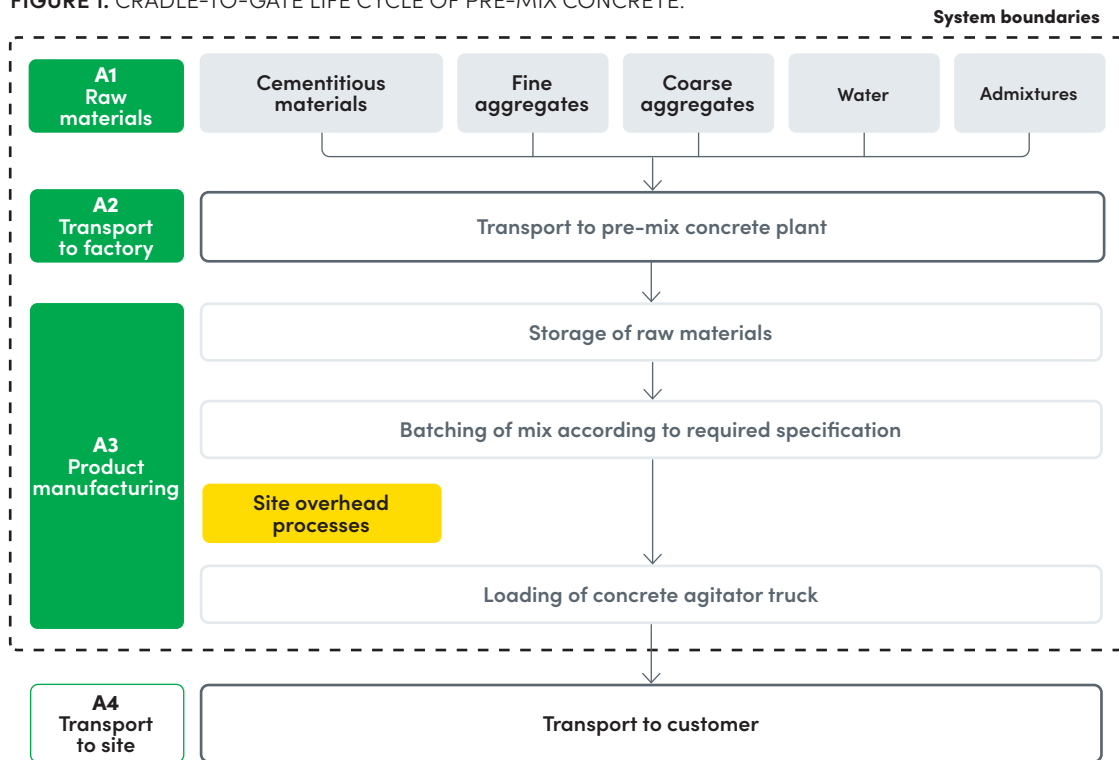
We were impressed by the early strengths we achieved through the Boral ENVISA and Aspire mix, which has provided a number of key program benefits. The 450 micro-strain achieved on the column load also allowed for significantly lower axial shortening, which improved the differential long-term deflection of the slab.

Cris Johansen,  
**Development Director, Mirvac**

# Cradle-to-gate life cycle

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

FIGURE 1. CRADLE-TO-GATE LIFE CYCLE OF PRE-MIX CONCRETE.



## 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

# Cradle-to-gate life cycle

## 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, as well as third-party quarries. General Purpose Cement (GP) and Ground Granulated Blast Furnace Slag (GGBFS) are supplied by local suppliers in Queensland using local or imported ingredients and delivered to our sites in rigid trucks. Fly ash is sourced from local power stations.

ZEP® additive and silica fume are mostly imported. Admixtures are sourced from locally based suppliers and transported using rigid trucks.

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 "MND" (Module Not Declared).  
MND is used when we cannot define a typical scenario.



Eagle Farm Batching Plant, QLD

# Cradle-to-gate life cycle

## Manufacturing stage (A3)

The typical 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), 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. Seven concrete production sites (Eagle Farm / Cleveland / Maroochydore / Toowoomba / Hervey Bay / Garbutt / Cairns) provided primary data.**

The LCA shows that these sites are representative for key regions in Qld. Data for admixtures have been sourced from EPDs published in December 2015 by EFCA (European Federation of Concrete Admixtures Associations) (EFCA 2015ae). Background data (e.g. for energy and transport processes, GP cement, blast furnace slag and fly ash) have predominantly been sourced from AusLCI and the AusLCI shadow database.

The Queensland quarry 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.

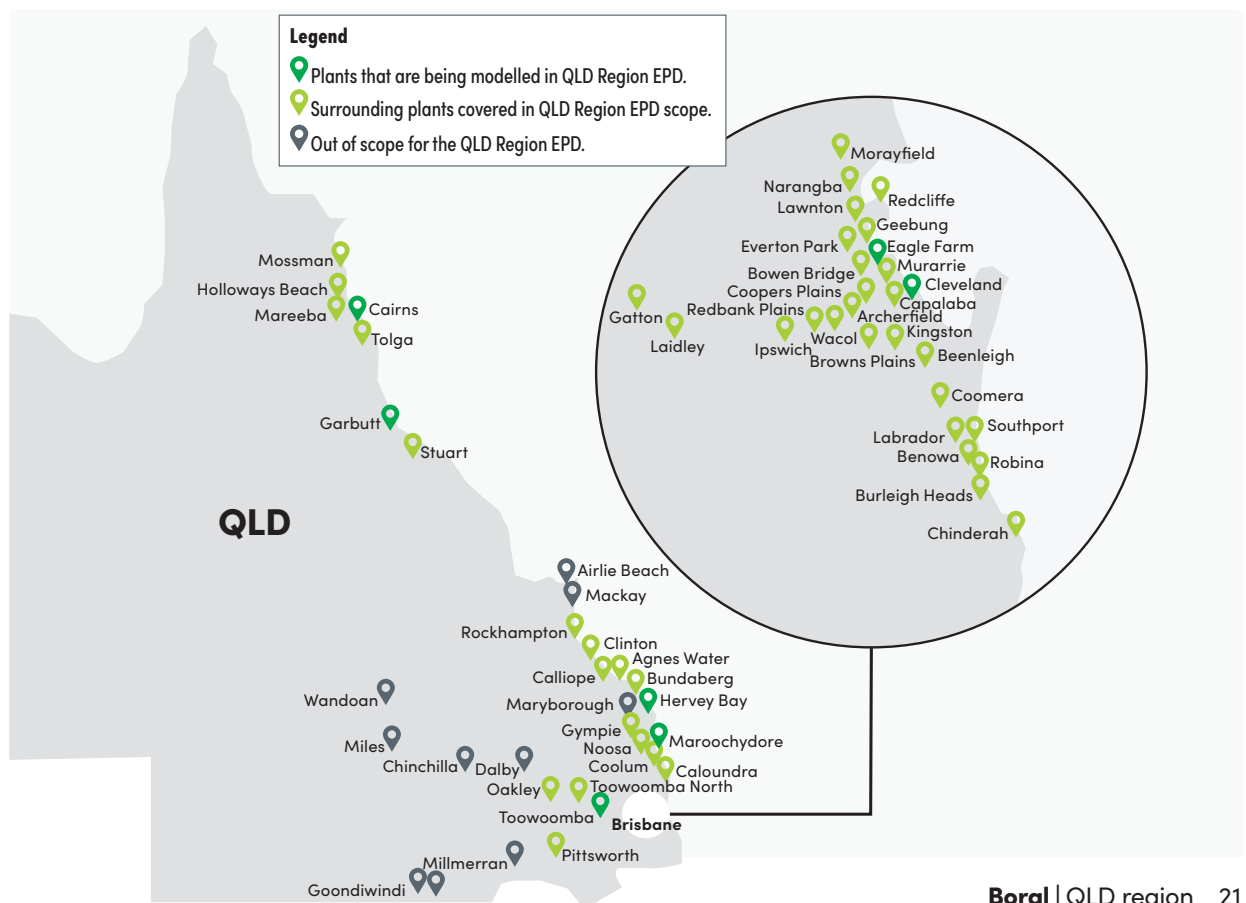
## Representative plants in each region

**Boral operates 58 concrete plants in the Queensland region.**

This EPD covers a sub-section of our concrete plants located in seven key regions:

- Eagle Farm for Brisbane
- Cleveland for Brisbane South and Gold Coast
- Maroochydore for Sunshine Coast
- Hervey Bay for Central Queensland
- Garbutt for Townsville
- Cairns for North Queensland region
- Toowoomba for Darling Downs region

(See pages 9-10 for details). 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. At each manufacturing site, energy use for concrete production has been allocated to the products based on a volume basis (total m<sup>3</sup> of pre-mix concrete products).
- **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.
- **Silica fume (micro-silica):** is a by-product of silicon metal or ferrosilicon alloys production. Economic allocation was applied to attribute some of the impacts of ferrosilicon production to silica fume.
- **Blast Furnace Slag (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.
- **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 analyses, 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 outside the scope of the LCA, in line with the PCR (Envirodec 2020a).
- The amount of packaging used for admixtures is well below the materiality cut-off. Nonetheless, packaging materials and quantities are included in the admixture EPD data.

## Key assumptions

- **Admixture data:** are based on generic EPDs that are valid for a range of different chemicals, including the admixtures used by Boral. No EPD has been published for Viscosity Modifying Admixtures (VMA); we have used an average of the five admixture EPDs published by EFCA as a proxy.
- **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.
- **Water consumption:** is not measured consistently across quarries. We have used AusLCI water consumption data per tonne of coarse and fine aggregates instead.
- **Cement data:** are based on generic AusLCI data for cement produced from imported clinker.
- **Blast Furnace Slag:** slag 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).



# Product composition

## Content declaration (% by weight)

TABLE 2. QLD PRODUCT COMPOSITIONS

Constituent	NORMAL CLASS GP BLEND	ENVIROCRETE® 30%	ENVIROCRETE® 40%
General purpose cement	10-22%	7-16%	4-12%
Ground granulated blast furnace slag	-	-	2-7%
Fly ash	-	2-6%	1-5%
Silica fume	-	-	-
Coarse aggregate	38-50%	38-50%	38-50%
Manufactured sand	0-22%	0-22%	0-23%
Natural sand	10-40%	12-40%	10-40%
Admixtures	<0.15%	<0.15%	<0.25%
Water	6-9%	6-9%	6-9%

TABLE 3. CONTINUED QLD PRODUCT COMPOSITIONS

Constituent	ENVIROCRETE® PLUS*	ENVISIA®*	QLD TMR	Special
General purpose cement	4-10%	3-10%	10-16%	1-22%
Ground granulated blast furnace slag	4-10%	5-14%	0-4%	0-10%
Fly ash	1-3%	-	4-7%	0-6%
Silica fume	-	-	-	<1%
Coarse aggregate	38-50%	38-50%	40-50%	0-85%
Manufactured sand	0-23%	0-22%	0-18%	0-89%
Natural sand	10-40%	10-40%	12-35%	0-90%
Admixtures	<0.25%	<0.4%	<0.3%	<0.5%
Water	6-9%	6-9%	6-9%	2-9%

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).

\* May include Zep® technology.

# 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 sometimes downstream) material and energy inputs and outputs. The results are provided for a range of environmental impact categories, in line with EN 15804 (CEN 2013).**

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: 1 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 sub-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.** IMPACT CATEGORIES INCLUDED IN THIS ASSESSMENT

Impact category	Acronym	Unit
Global warming potential	GWP	kg CO <sub>2</sub> equivalents
Ozone depletion potential	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

**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).**

## 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 LCA are based on data from one representative plant for each of the regions.**

The environmental profiles of concrete manufactured at other plants in the same region are largely similar, with variations mainly due to differences in transport distances for raw materials supplied to the concrete plant. The largest variation for the concrete mixes<sup>\*</sup> is found in 20 MPa ENVISIA®, as this is the concrete product with the smallest footprint and the largest contribution from transport. The variation across included sites for other concrete products is considerably lower, and most mandatory indicators stay well within the ±10% range as required by the PCR (Environdec 2020a). We have analysed the maximum variation (caused by differences in transport) for each region:

- **Brisbane:** the variations for all plants covered in the Brisbane region stay within ±10% of the reported values for Eagle Farm.
- **Brisbane South and Gold Coast:** the variations for all concrete mixes and plants covered in the Brisbane and Gold Coast region stay within ±10% of the reported values for Cleveland, except for ozone layer depletion (20%) and photochemical oxidant creation (15%).
- **Sunshine Coast:** the variations for all concrete mixes and plants covered in the Sunshine Coast region stay within ±10% of the reported values for Maroochydore.
- **Darling Downs:** the variations for all concrete mixes and plants covered in the Darling Downs region stay within ±10% of the reported values for Toowoomba, except for ozone layer depletion (17%) and photochemical oxidant creation (14%).
- **Central Queensland:** the variations for all concrete mixes and plants covered in the Central Queensland region stay within ±10% of the reported values for Hervey Bay, except for ozone layer depletion (27%), photochemical oxidant creation (22%) and abiotic depletion (fossil fuels) (12%).
- **Townsville:** the variations for all concrete mixes and plants covered in the Townsville region stay within ±10% of the reported values for Garbutt.
- **North Queensland:** the variations for all concrete mixes and plants covered in the Northern Queensland region stay within ±10% of the reported values for Cairns, except for ozone layer depletion (26%), eutrophication (11%), photochemical oxidant creation (23%) and abiotic depletion (fossil fuels) (12%).

<sup>\*</sup> The variation for stabilised sand and lean mix 20:1 products is much more dependent on transport of aggregates and exceeds 10% in most cases. Specific data should be sought from Boral if these mixes are important for your footprint and are sourced from plants other than the representative plant that has been modelled.

# Brisbane region

Environmental profiles and parameters



# Product table list

## Brisbane region

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

### Lower carbon concrete products

#### Table No. 1 and 2 .....30

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

#### Table No. 3 and 4 .....31

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

#### Table No. 5 and 6 .....32

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

#### Table No. 7 and 8 .....33

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

### Normal class concrete products

#### Table No. 9 and 10 .....34

- 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

### Concrete for special applications

#### Table No. 11 and 12 .....35

- HIGH SLUMP 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- HIGH SLUMP 80 MPa

#### Table No. 13 and 14 .....36

- STABILISED SAND 10:1
- KERB MACHINE 280kg
- KERB MACHINE 320kg
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE
- TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE

#### Table No. 15 and 16 .....37

- LEAN MIX 20:1
- NO FINES 6:1
- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- SHOTCRETE 32 MPa

#### Table No. 17 and 18 .....38

- ASPIRE® 40 GPa – 65 MPa
- ASPIRE® 45 GPa – 80 MPa
- ASPIRE® 50 GPa – 100 MPa

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

Brisbane region

ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	
196	217	259	320	
ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
191	215	256	326	
ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa	
252	267	335	435	
ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa	
206	228	280	341	
NORMAL CLASS GP BLEND 25 MPa	NORMAL CLASS GP BLEND 32 MPa	NORMAL CLASS GP BLEND 40 MPa	NORMAL CLASS GP BLEND 50 MPa	
324	346	415	538	
HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa		
351	362	559		
KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE
257	296	387	388	356
NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa	
252	372	355	351	
ASPIRE® 45 GPa—80 MPa	ASPIRE® 50 GPa—100 MPa			
457	508			

# Brisbane region

**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, BRISBANE (QLD), PER M<sup>3</sup>**

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>174</b>	<b>196</b>	<b>217</b>	<b>259</b>	<b>320</b>
<b>ODP</b>	kg CFC11 eq	5.81E-06	6.25E-06	6.64E-06	7.45E-06	8.62E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.933	1.05	1.16	1.39	1.71
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.120	0.133	0.146	0.171	0.208
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0613	0.0669	0.0724	0.0831	0.0991
<b>ADPE</b>	kg Sb eq	7.52E-06	8.43E-06	1.01E-05	1.20E-05	1.78E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1560	1730	1670	2230	2750

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, BRISBANE (QLD), PER M<sup>3</sup>**

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	2.18E+01	2.44E+01	2.75E+01	3.29E+01	4.37E+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>	2.18E+01	2.44E+01	2.75E+01	3.29E+01	4.37E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.61E+03	1.78E+03	1.95E+03	2.29E+03	2.82E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	6.57E+00	7.38E+00	8.98E+00	1.08E+01	2.35E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	1.61E+03	1.79E+03	1.96E+03	2.30E+03	2.84E+03
<b>SM</b>	kg	1.56E+02	1.79E+02	2.03E+02	2.50E+02	3.12E+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>	3.51E+00	3.54E+00	3.51E+00	3.53E+00	3.63E+00
<b>HWD</b>	kg	1.17E-05	1.31E-05	1.60E-05	1.93E-05	3.54E-05
<b>NHWD</b>	kg	1.57E+00	1.77E+00	2.13E+00	2.56E+00	3.43E+00
<b>RWD</b>	kg	2.30E-03	2.60E-03	3.16E-03	3.81E-03	6.78E-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



## Brisbane region

**TABLE 3.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, BRISBANE (QLD), 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
GWP	kg CO <sub>2</sub> eq	179	191	215	256	326
ODP	kg CFC11 eq	5.63E-06	5.85E-06	6.30E-06	7.06E-06	8.30E-06
AP	kg SO <sub>2</sub> eq	0.893	0.951	1.07	1.28	1.63
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.119	0.126	0.140	0.164	0.204
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0594	0.0623	0.0683	0.0782	0.0950
ADPE	kg Sb eq	7.74E-06	8.86E-06	1.04E-05	1.18E-05	1.54E-05
ADPF	MJ <sub>NCV</sub>	1520	1610	1800	2100	2630

**TABLE 4.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, BRISBANE (QLD), 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
PERE	MJ <sub>NCV</sub>	2.04E+01	2.20E+01	2.50E+01	2.94E+01	3.76E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.04E+01	2.20E+01	2.50E+01	2.94E+01	3.76E+01
PENRE	MJ <sub>NCV</sub>	1.57E+03	1.66E+03	1.85E+03	2.16E+03	2.69E+03
PENRM	MJ <sub>NCV</sub>	7.39E+00	8.57E+00	1.02E+01	1.15E+01	1.52E+01
PENRT	MJ <sub>NCV</sub>	1.57E+03	1.67E+03	1.86E+03	2.17E+03	2.71E+03
SM	kg	1.44E+02	1.55E+02	1.77E+02	2.17E+02	2.86E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.53E+00	3.53E+00	3.54E+00	3.60E+00	3.63E+00
HWD	kg	1.26E-05	1.46E-05	1.74E-05	1.98E-05	2.60E-05
NHWD	kg	1.58E+00	1.82E+00	2.16E+00	2.46E+00	3.22E+00
RWD	kg	2.48E-03	2.87E-03	3.42E-03	3.89E-03	5.12E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Brisbane region

**TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, BRISBANE (QLD), 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
GWP	kg CO <sub>2</sub> eq	225	252	267	335	435
ODP	kg CFC11 eq	5.42E-06	5.75E-06	6.00E-06	6.86E-06	8.10E-06
AP	kg SO <sub>2</sub> eq	0.917	1.02	1.08	1.35	1.73
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.132	0.145	0.153	0.188	0.238
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0587	0.0634	0.0665	0.0787	0.0966
ADPE	kg Sb eq	4.57E-06	4.97E-06	5.47E-06	6.89E-06	1.04E-05
ADPF	MJ <sub>NCV</sub>	1590	1750	1850	2270	2890

**TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, BRISBANE (QLD), 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
PERE	MJ <sub>NCV</sub>	1.75E+01	1.94E+01	2.07E+01	2.57E+01	3.41E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.75E+01	1.94E+01	2.07E+01	2.57E+01	3.41E+01
PENRE	MJ <sub>NCV</sub>	1.64E+03	1.80E+03	1.90E+03	2.32E+03	2.95E+03
PENRM	MJ <sub>NCV</sub>	2.46E+00	2.75E+00	4.28E+00	5.53E+00	1.02E+01
PENRT	MJ <sub>NCV</sub>	1.64E+03	1.80E+03	1.91E+03	2.33E+03	2.96E+03
SM	kg	7.28E+01	7.80E+01	7.49E+01	9.67E+01	1.31E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.51E+00	3.54E+00	3.68E+00	3.76E+00	3.86E+00
HWD	kg	5.92E-06	6.49E-06	7.72E-06	9.93E-06	1.70E-05
NHWD	kg	9.17E-01	1.00E+00	1.06E+00	1.36E+00	2.02E+00
RWD	kg	1.17E-03	1.29E-03	1.53E-03	1.97E-03	3.32E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

## Brisbane region

**TABLE 7.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, BRISBANE (QLD), 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
GWP	kg CO <sub>2</sub> eq	185	206	228	280	341
ODP	kg CFC11 eq	5.52E-06	5.89E-06	6.28E-06	7.17E-06	8.16E-06
AP	kg SO <sub>2</sub> eq	0.876	0.974	1.08	1.32	1.61
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.119	0.131	0.144	0.173	0.207
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0584	0.0633	0.0685	0.0802	0.0939
ADPE	kg Sb eq	7.73E-06	8.86E-06	1.04E-05	1.19E-05	1.53E-05
ADPF	MJ <sub>NCV</sub>	1510	1660	1830	2190	2630

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

Parameter	Unit	ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40MPa	ENVIROCRETE® 40% 50MPa
PERE	MJ <sub>NCV</sub>	1.95E+01	2.17E+01	2.44E+01	2.93E+01	3.61E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.95E+01	2.17E+01	2.44E+01	2.93E+01	3.61E+01
PENRE	MJ <sub>NCV</sub>	1.55E+03	1.71E+03	1.88E+03	2.25E+03	2.69E+03
PENRM	MJ <sub>NCV</sub>	7.39E+00	8.57E+00	1.02E+01	1.15E+01	1.52E+01
PENRT	MJ <sub>NCV</sub>	1.56E+03	1.72E+03	1.89E+03	2.26E+03	2.71E+03
SM	kg	1.27E+02	1.46E+02	1.63E+02	2.08E+02	2.60E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.54E+00	3.56E+00	3.56E+00	3.65E+00	3.65E+00
HWD	kg	1.26E-05	1.46E-05	1.74E-05	1.98E-05	2.60E-05
NHWD	kg	1.57E+00	1.81E+00	2.15E+00	2.45E+00	3.20E+00
RWD	kg	2.48E-03	2.87E-03	3.42E-03	3.89E-03	5.12E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Brisbane region

**TABLE 9.** ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, BRISBANE (QLD), 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
GWP	kg CO <sub>2</sub> eq	287	324	346	415	538
ODP	kg CFC11 eq	5.97E-06	6.42E-06	6.77E-06	7.56E-06	8.99E-06
AP	kg SO <sub>2</sub> eq	1.16	1.30	1.39	1.66	2.14
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.162	0.181	0.193	0.227	0.289
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0677	0.0742	0.0786	0.0903	0.1115
ADPE	kg Sb eq	4.73E-06	5.16E-06	5.68E-06	7.11E-06	1.06E-05
ADPF	MJ <sub>NCV</sub>	1940	2170	2310	2720	3470

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, BRISBANE (QLD), 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
PERE	MJ <sub>NCV</sub>	2.16E+01	2.41E+01	2.59E+01	3.10E+01	4.09E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.16E+01	2.41E+01	2.59E+01	3.10E+01	4.09E+01
PENRE	MJ <sub>NCV</sub>	1.99E+03	2.22E+03	2.37E+03	2.78E+03	3.55E+03
PENRM	MJ <sub>NCV</sub>	2.46E+00	2.75E+00	4.28E+00	5.53E+00	1.02E+01
PENRT	MJ <sub>NCV</sub>	2.00E+03	2.22E+03	2.37E+03	2.79E+03	3.56E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.69E+00	3.75E+00	3.91E+00	3.99E+00	4.16E+00
HWD	kg	5.92E-06	6.49E-06	7.72E-06	9.93E-06	1.70E-05
NHWD	kg	9.30E-01	1.02E+00	1.08E+00	1.38E+00	2.04E+00
RWD	kg	1.17E-03	1.29E-03	1.53E-03	1.97E-03	3.32E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

## Brisbane region

**TABLE 11.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE (QLD), PER M<sup>3</sup>

Indicator	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
<b>GWP</b>	kg CO <sub>2</sub> eq	<b>317</b>	<b>351</b>	<b>362</b>	<b>559</b>
<b>ODP</b>	kg CFC11 eq	5.06E-06	8.35E-06	7.97E-06	9.56E-06
<b>AP</b>	kg SO <sub>2</sub> eq	1.50	1.65	1.60	2.23
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.194	0.213	0.211	0.301
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0885	0.0956	0.0926	0.119
<b>ADPE</b>	kg Sb eq	1.08E-05	5.28E-06	1.63E-05	2.63E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	2450	2680	2620	3680

**TABLE 12.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE (QLD), PER M<sup>3</sup>

Parameter	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	3.25E+01	3.43E+01	3.57E+01	5.24E+01
<b>PERM</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	9.29E-02	2.05E-01
<b>PERT</b>	MJ <sub>NCV</sub>	3.25E+01	3.43E+01	3.57E+01	5.26E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	2.51E+03	2.74E+03	2.69E+03	3.76E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	1.31E+01	1.47E+01	6.88E+00	1.52E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	2.53E+03	2.76E+03	2.69E+03	3.77E+03
<b>SM</b>	kg	2.50E+02	2.70E+02	2.38E+02	1.27E+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>	3.57E+00	3.66E+00	3.69E+00	4.19E+00
<b>HWD</b>	kg	2.01E-05	1.86E-05	2.88E-05	5.57E-05
<b>NHWD</b>	kg	2.05E+00	2.81E-01	3.68E+00	5.59E+00
<b>RWD</b>	kg	3.86E-03	3.16E-03	4.02E-03	7.04E-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

# Brisbane region

**TABLE 13.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE (QLD), PER M<sup>3</sup>

Indicator	Unit	STABILISED SAND 10:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE
<b>GWP</b>	kg CO <sub>2</sub> eq	<b>127</b>	<b>257</b>	<b>296</b>	<b>387</b>	<b>388</b>	<b>356</b>
<b>ODP</b>	kg CFC11 eq	3.63E-06	5.74E-06	6.14E-06	7.56E-06	7.55E-06	7.81E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.525	1.04	1.19	1.55	1.56	1.56
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0785	0.147	0.166	0.214	0.214	0.206
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0369	0.0640	0.0704	0.0883	0.0891	0.0919
<b>ADPE</b>	kg Sb eq	7.01E-07	8.18E-06	9.50E-06	7.89E-06	1.69E-05	2.58E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	940	1790	2020	2580	2610	2640

**TABLE 14.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE (QLD), PER M<sup>3</sup>

Parameter	Unit	STABILISED SAND 10:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE
<b>PERE</b>	MJ <sub>NCV</sub>	9.22E+00	2.07E+01	2.37E+01	2.95E+01	3.34E+01	4.09E+01
<b>PERM</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.35E-02	1.08E-01
<b>PERT</b>	MJ <sub>NCV</sub>	9.22E+00	2.07E+01	2.37E+01	2.95E+01	3.34E+01	4.10E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	9.72E+02	1.83E+03	2.07E+03	2.65E+03	2.67E+03	2.70E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	0.00E+00	2.98E+00	3.52E+00	6.25E+00	4.71E+00	1.62E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	9.72E+02	1.84E+03	2.07E+03	2.65E+03	2.68E+03	2.71E+03
<b>SM</b>	kg	3.64E+01	7.28E+01	8.63E+01	1.14E+02	1.14E+02	2.34E+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>	2.81E+00	3.56E+00	3.48E+00	3.78E+00	3.86E+00	3.58E+00
<b>HWD</b>	kg	0.00E+00	9.62E-06	1.12E-05	1.13E-05	2.46E-05	4.73E-05
<b>NHWD</b>	kg	7.68E-02	1.91E+00	2.23E+00	1.57E+00	4.04E+00	5.81E+00
<b>RWD</b>	kg	0.00E+00	2.01E-03	2.36E-03	2.25E-03	3.90E-03	7.39E-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

## Brisbane region

**TABLE 15.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE (QLD), PER M<sup>3</sup>

Indicator	Unit	LEAN MIX 20:1	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>92</b>	<b>252</b>	<b>372</b>	<b>355</b>	<b>351</b>
<b>ODP</b>	kg CFC11 eq	3.93E-06	5.40E-06	7.35E-06	7.16E-06	6.86E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.396	1.02	1.49	1.42	1.41
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0654	0.143	0.206	0.198	0.194
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0361	0.0603	0.0854	0.0825	0.0801
<b>ADPE</b>	kg Sb eq	8.59E-07	1.21E-06	8.14E-06	6.68E-06	6.81E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	790	1710	2490	2390	2340

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

Parameter	Unit	LEAN MIX 20:1	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	7.19E+00	1.76E+01	2.87E+01	2.70E+01	2.64E+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>	7.19E+00	1.76E+01	2.87E+01	2.70E+01	2.64E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	8.26E+02	1.75E+03	2.55E+03	2.45E+03	2.40E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	7.16E+00	6.23E+00	4.26E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	8.26E+02	1.75E+03	2.56E+03	2.45E+03	2.40E+03
<b>SM</b>	kg	1.77E+01	0.00E+00	1.09E+02	1.04E+02	1.04E+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>	3.45E+00	2.97E+00	3.81E+00	3.80E+00	3.65E+00
<b>HWD</b>	kg	0.00E+00	0.00E+00	1.24E-05	1.03E-05	8.78E-06
<b>NHWD</b>	kg	8.24E-02	1.12E-01	1.59E+00	1.24E+00	1.42E+00
<b>RWD</b>	kg	0.00E+00	0.00E+00	2.44E-03	2.00E-03	1.78E-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

# Brisbane region

**TABLE 17.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE (QLD), PER M<sup>3</sup>

Indicator	Unit	ASPIRE® 40 GPa – 65 MPa	ASPIRE® 45 GPa – 80 MPa	ASPIRE® 50 GPa – 100 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>415</b>	<b>457</b>	<b>508</b>
<b>ODP</b>	kg CFC11 eq	9.72E-06	1.11E-05	1.41E-05
<b>AP</b>	kg SO <sub>2</sub> eq	1.88	2.07	2.41
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.242	0.266	0.306
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.115	0.131	0.164
<b>ADPE</b>	kg Sb eq	2.83E-05	3.04E-05	4.48E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	3210	3580	4300

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

Parameter	Unit	ASPIRE® 40 GPa – 65 MPa	ASPIRE® 45 GPa – 80 MPa	ASPIRE® 50 GPa – 100 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	7.94E+01	9.81E+01	1.45E+02
<b>PERM</b>	MJ <sub>NCV</sub>	2.12E-01	2.17E-01	3.99E-01
<b>PERT</b>	MJ <sub>NCV</sub>	7.96E+01	9.83E+01	1.45E+02
<b>PENRE</b>	MJ <sub>NCV</sub>	3.27E+03	3.63E+03	4.35E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	2.39E+01	2.66E+01	4.23E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	3.29E+03	3.66E+03	4.39E+03
<b>SM</b>	kg	1.61E+02	1.72E+02	2.70E+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>	1.65E+01	2.31E+01	3.63E+01
<b>HWD</b>	kg	6.60E-05	7.06E-05	1.15E-04
<b>NHWD</b>	kg	5.71E+00	6.08E+00	8.65E+00
<b>RWD</b>	kg	8.72E-03	9.49E-03	1.44E-02
<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





# Brisbane South and Gold Coast region

**Environmental profiles and parameters**

# Product table list

## Brisbane South and Gold Coast region

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

### Lower carbon concrete products

#### Table No. 1 and 2 .....42

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

#### Table No. 3 and 4 .....43

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

#### Table No. 5 and 6 .....44

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

#### Table No. 7 and 8 .....45

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

### Normal class concrete products

#### Table No. 9 and 10 .....46

- 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

### Concrete for special applications

#### Table No. 11 and 12 .....47

- HIGH SLUMP 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- HIGH SLUMP 80 MPa

#### Table No. 13 and 14 .....48

- STABILISED SAND 12:1
- KERB MACHINE 280kg
- KERB MACHINE 320kg
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE
- TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE

#### Table No. 15 and 16 .....49

- LEAN MIX 20:1
- NO FINES 6:1
- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- SHOTCRETE 32 MPa

#### Table No. 17 and 18 .....50

- ASPIRE® 40 GPa – 65 MPa
- ASPIRE® 45 GPa – 80 MPa
- ASPIRE® 50 GPa – 100 MPa

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

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ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	
168	184	201	256	311	
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
173	192	213	253	310	
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa	
222	249	279	339	407	
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa	
179	199	221	263	321	
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	
294	326	379	453	533	
HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa		
313	407	492	519		
STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE
175	255	295	378	373	351
LEAN MIX 20:1	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa	
112	266	358	350	374	
ASPIRE® 40 GPa – 65 MPa	ASPIRE® 45 GPa – 80 MPa	ASPIRE® 50 GPa – 100 MPa			
420	461	512			

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**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>**

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>168</b>	<b>184</b>	<b>201</b>	<b>256</b>	<b>311</b>
<b>ODP</b>	kg CFC11 eq	5.47E-06	5.81E-06	6.18E-06	7.24E-06	8.21E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.899	0.990	1.08	1.37	1.66
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.113	0.123	0.134	0.167	0.199
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0583	0.0626	0.0672	0.0816	0.0948
<b>ADPE</b>	kg Sb eq	3.70E-06	4.08E-06	4.42E-06	1.05E-05	1.01E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1470	1600	1730	2200	2630

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>**

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	1.95E+01	2.14E+01	2.32E+01	3.28E+01	3.95E+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>	1.95E+01	2.14E+01	2.32E+01	3.28E+01	3.95E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.52E+03	1.65E+03	1.79E+03	2.26E+03	2.70E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	3.41E+00	3.82E+00	4.23E+00	1.44E+01	1.87E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	1.52E+03	1.66E+03	1.79E+03	2.27E+03	2.72E+03
<b>SM</b>	kg	1.56E+02	1.75E+02	1.93E+02	2.50E+02	3.12E+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>	3.29E+00	3.30E+00	3.35E+00	3.45E+00	3.44E+00
<b>HWD</b>	kg	6.00E-06	6.66E-06	6.88E-06	2.12E-05	2.43E-05
<b>NHWD</b>	kg	7.16E-01	7.95E-01	8.73E-01	1.97E+00	1.60E+00
<b>RWD</b>	kg	1.15E-03	1.27E-03	1.34E-03	4.03E-03	4.49E-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

# Brisbane South and Gold Coast region

**TABLE 3.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), 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
GWP	kg CO <sub>2</sub> eq	173	192	213	253	310
ODP	kg CFC11 eq	5.34E-06	5.70E-06	6.09E-06	6.84E-06	7.73E-06
AP	kg SO <sub>2</sub> eq	0.861	0.960	1.06	1.27	1.54
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.112	0.124	0.136	0.159	0.191
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0571	0.0619	0.0670	0.0770	0.0897
ADPE	kg Sb eq	7.96E-06	9.43E-06	1.02E-05	1.29E-05	1.76E-05
ADPF	MJ <sub>NCV</sub>	1450	1600	1750	2060	2490

**TABLE 4.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), 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
PERE	MJ <sub>NCV</sub>	1.93E+01	2.17E+01	2.39E+01	2.89E+01	3.69E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.93E+01	2.17E+01	2.39E+01	2.89E+01	3.69E+01
PENRE	MJ <sub>NCV</sub>	1.50E+03	1.65E+03	1.80E+03	2.12E+03	2.56E+03
PENRM	MJ <sub>NCV</sub>	4.92E+00	5.90E+00	6.39E+00	9.09E+00	1.49E+01
PENRT	MJ <sub>NCV</sub>	1.50E+03	1.65E+03	1.81E+03	2.13E+03	2.57E+03
SM	kg	1.39E+02	1.60E+02	1.80E+02	2.20E+02	2.75E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.34E+00	3.35E+00	3.38E+00	3.42E+00	3.47E+00
HWD	kg	1.09E-05	1.31E-05	1.42E-05	1.90E-05	2.82E-05
NHWD	kg	1.84E+00	2.19E+00	2.37E+00	2.97E+00	3.93E+00
RWD	kg	2.24E-03	2.69E-03	2.91E-03	3.85E-03	5.64E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Brisbane South and Gold Coast region

**TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), 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
GWP	kg CO <sub>2</sub> eq	222	249	279	339	407
ODP	kg CFC11 eq	5.25E-06	5.60E-06	6.01E-06	6.81E-06	7.54E-06
AP	kg SO <sub>2</sub> eq	0.897	1.00	1.12	1.36	1.62
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.127	0.141	0.156	0.187	0.220
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0576	0.0624	0.0679	0.0790	0.0903
ADPE	kg Sb eq	3.72E-06	4.11E-06	4.47E-06	5.44E-06	7.99E-06
ADPF	MJ <sub>NCV</sub>	1560	1720	1900	2270	2690

**TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), 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
PERE	MJ <sub>NCV</sub>	1.71E+01	1.90E+01	2.09E+01	2.52E+01	3.15E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.71E+01	1.90E+01	2.09E+01	2.52E+01	3.15E+01
PENRE	MJ <sub>NCV</sub>	1.60E+03	1.77E+03	1.95E+03	2.32E+03	2.75E+03
PENRM	MJ <sub>NCV</sub>	3.41E+00	3.82E+00	4.23E+00	5.26E+00	1.01E+01
PENRT	MJ <sub>NCV</sub>	1.60E+03	1.77E+03	1.95E+03	2.33E+03	2.76E+03
SM	kg	7.28E+01	7.80E+01	8.01E+01	9.98E+01	1.12E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.41E+00	3.45E+00	3.53E+00	3.61E+00	3.67E+00
HWD	kg	6.00E-06	6.66E-06	6.88E-06	8.54E-06	1.49E-05
NHWD	kg	6.76E-01	7.51E-01	8.25E-01	1.01E+00	1.43E+00
RWD	kg	1.15E-03	1.27E-03	1.34E-03	1.66E-03	2.85E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Brisbane South and Gold Coast region

**TABLE 7.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), 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
GWP	kg CO <sub>2</sub> eq	179	199	221	263	321
ODP	kg CFC11 eq	5.28E-06	5.63E-06	6.02E-06	6.75E-06	7.61E-06
AP	kg SO <sub>2</sub> eq	0.845	0.941	1.04	1.24	1.51
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.113	0.125	0.137	0.161	0.193
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0561	0.0608	0.0658	0.0754	0.0877
ADPE	kg Sb eq	3.75E-06	4.39E-06	4.74E-06	6.03E-06	8.31E-06
ADPF	MJ <sub>NCV</sub>	1430	1570	1730	2030	2450

**TABLE 8.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), 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
PERE	MJ <sub>NCV</sub>	1.70E+01	1.90E+01	2.09E+01	2.51E+01	3.18E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.70E+01	1.90E+01	2.09E+01	2.51E+01	3.18E+01
PENRE	MJ <sub>NCV</sub>	1.47E+03	1.62E+03	1.78E+03	2.08E+03	2.51E+03
PENRM	MJ <sub>NCV</sub>	4.10E+00	4.92E+00	5.33E+00	7.57E+00	1.24E+01
PENRT	MJ <sub>NCV</sub>	1.48E+03	1.63E+03	1.78E+03	2.09E+03	2.52E+03
SM	kg	1.27E+02	1.46E+02	1.63E+02	2.01E+02	2.50E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.35E+00	3.36E+00	3.40E+00	3.44E+00	3.48E+00
HWD	kg	6.28E-06	7.53E-06	8.16E-06	1.12E-05	1.74E-05
NHWD	kg	6.92E-01	8.16E-01	8.82E-01	1.10E+00	1.44E+00
RWD	kg	1.21E-03	1.45E-03	1.57E-03	2.13E-03	3.27E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 9.** ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), 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
GWP	kg CO <sub>2</sub> eq	294	326	379	453	533
ODP	kg CFC11 eq	5.92E-06	6.31E-06	7.02E-06	7.94E-06	8.78E-06
AP	kg SO <sub>2</sub> eq	1.18	1.30	1.51	1.80	2.11
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.163	0.179	0.206	0.244	0.284
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0684	0.0740	0.0836	0.0967	0.110
ADPE	kg Sb eq	3.91E-06	4.32E-06	4.73E-06	5.75E-06	8.33E-06
ADPF	MJ <sub>NCV</sub>	1970	2160	2480	2930	3420

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, BRISBANE SOUTH AND GOLD COAST (QLD), 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
PERE	MJ <sub>NCV</sub>	2.18E+01	2.40E+01	2.75E+01	3.27E+01	3.98E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.18E+01	2.40E+01	2.75E+01	3.27E+01	3.98E+01
PENRE	MJ <sub>NCV</sub>	2.02E+03	2.21E+03	2.54E+03	3.00E+03	3.49E+03
PENRM	MJ <sub>NCV</sub>	3.41E+00	3.82E+00	4.23E+00	5.26E+00	1.01E+01
PENRT	MJ <sub>NCV</sub>	2.02E+03	2.22E+03	2.55E+03	3.00E+03	3.50E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.62E+00	3.67E+00	3.82E+00	3.94E+00	4.04E+00
HWD	kg	6.00E-06	6.66E-06	6.88E-06	8.54E-06	1.49E-05
NHWD	kg	6.91E-01	7.67E-01	8.46E-01	1.04E+00	1.45E+00
RWD	kg	1.15E-03	1.27E-03	1.34E-03	1.66E-03	2.85E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00



# Brisbane South and Gold Coast region

**TABLE 11.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>

Indicator	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
GWP	kg CO <sub>2</sub> eq	313	407	492	519
ODP	kg CFC11 eq	7.67E-06	7.53E-06	8.56E-06	8.93E-06
AP	kg SO <sub>2</sub> eq	1.49	1.62	1.96	2.06
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.190	0.221	0.263	0.277
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0878	0.0905	0.106	0.111
ADPE	kg Sb eq	1.06E-05	9.75E-06	1.49E-05	1.94E-05
ADPF	MJ <sub>NCV</sub>	2420	2700	3210	3390

**TABLE 12.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>

Parameter	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
PERE	MJ <sub>NCV</sub>	3.20E+01	3.24E+01	4.17E+01	4.52E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	1.30E-01	1.37E-01
PERT	MJ <sub>NCV</sub>	3.20E+01	3.24E+01	4.19E+01	4.53E+01
PENRE	MJ <sub>NCV</sub>	2.48E+03	2.76E+03	3.28E+03	3.46E+03
PENRM	MJ <sub>NCV</sub>	1.31E+01	1.13E+01	9.63E+00	1.02E+01
PENRT	MJ <sub>NCV</sub>	2.49E+03	2.77E+03	3.29E+03	3.47E+03
SM	kg	2.50E+02	1.12E+02	1.12E+02	1.19E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.56E+00	3.68E+00	3.84E+00	3.95E+00
HWD	kg	2.01E-05	1.77E-05	3.34E-05	3.87E-05
NHWD	kg	2.03E+00	1.85E+00	3.01E+00	4.21E+00
RWD	kg	3.86E-03	3.41E-03	4.03E-03	5.05E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 13.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>

Indicator	Unit	STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE
GWP	kg CO <sub>2</sub> eq	175	255	295	378	373	351
ODP	kg CFC11 eq	3.83E-06	5.75E-06	6.30E-06	7.27E-06	7.32E-06	7.79E-06
AP	kg SO <sub>2</sub> eq	0.703	1.03	1.18	1.52	1.49	1.55
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0988	0.144	0.165	0.206	0.204	0.203
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0425	0.0640	0.0715	0.0868	0.0859	0.0915
ADPE	kg Sb eq	6.14E-07	4.15E-06	4.81E-06	1.72E-05	7.02E-06	2.45E-05
ADPF	MJ <sub>NCV</sub>	1200	1760	2010	2540	2490	2580

**TABLE 14.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>

Parameter	Unit	STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE C1 EXPOSURE
PERE	MJ <sub>NCV</sub>	1.26E+01	1.94E+01	2.23E+01	3.35E+01	2.86E+01	3.97E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	8.79E-02	0.00E+00	1.53E-01
PERT	MJ <sub>NCV</sub>	1.26E+01	1.94E+01	2.23E+01	3.36E+01	2.86E+01	3.99E+01
PENRE	MJ <sub>NCV</sub>	1.23E+03	1.81E+03	2.06E+03	2.60E+03	2.55E+03	2.65E+03
PENRM	MJ <sub>NCV</sub>	0.00E+00	3.82E+00	4.51E+00	6.52E+00	9.34E+00	1.13E+01
PENRT	MJ <sub>NCV</sub>	1.23E+03	1.81E+03	2.06E+03	2.60E+03	2.56E+03	2.66E+03
SM	kg	0.00E+00	7.28E+01	8.63E+01	1.11E+02	1.42E+02	2.34E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	2.64E+00	3.54E+00	3.62E+00	3.67E+00	3.59E+00	3.78E+00
HWD	kg	0.00E+00	6.73E-06	7.84E-06	2.90E-05	1.35E-05	4.63E-05
NHWD	kg	6.91E-02	7.53E-01	8.79E-01	4.00E+00	1.20E+00	5.65E+00
RWD	kg	0.00E+00	1.28E-03	1.50E-03	4.23E-03	2.55E-03	6.39E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Brisbane South and Gold Coast region

**TABLE 15.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>

Indicator	Unit	LEAN MIX 20:1	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>112</b>	<b>266</b>	<b>358</b>	<b>350</b>	<b>374</b>
<b>ODP</b>	kg CFC11 eq	4.09E-06	5.22E-06	6.95E-06	6.85E-06	7.19E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.469	1.07	1.43	1.40	1.49
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0728	0.147	0.196	0.192	0.204
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0394	0.0606	0.0817	0.0801	0.0847
<b>ADPE</b>	kg Sb eq	6.53E-07	9.66E-07	5.72E-06	5.59E-06	4.41E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	900	1750	2380	2330	2470

**TABLE 16.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>

Parameter	Unit	LEAN MIX 20:1	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	8.35E+00	1.79E+01	2.68E+01	2.62E+01	2.71E+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>	8.35E+00	1.79E+01	2.68E+01	2.62E+01	2.71E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	9.33E+02	1.80E+03	2.44E+03	2.39E+03	2.53E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	5.60E+00	5.46E+00	4.72E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	9.33E+02	1.80E+03	2.44E+03	2.39E+03	2.53E+03
<b>SM</b>	kg	2.60E+01	0.00E+00	1.07E+02	1.04E+02	1.12E+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>	3.56E+00	2.82E+00	3.63E+00	3.63E+00	3.56E+00
<b>HWD</b>	kg	0.00E+00	0.00E+00	9.09E-06	8.87E-06	7.21E-06
<b>NHWD</b>	kg	6.87E-02	9.45E-02	1.07E+00	1.05E+00	7.30E-01
<b>RWD</b>	kg	0.00E+00	0.00E+00	1.77E-03	1.72E-03	1.37E-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 17.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>

Indicator	Unit	ASPIRE® 40 GPa – 65 MPa	ASPIRE® 45 GPa – 80 MPa	ASPIRE® 50 GPa – 100 MPa
GWP	kg CO <sub>2</sub> eq	420	461	512
ODP	kg CFC11 eq	1.03E-05	1.17E-05	1.47E-05
AP	kg SO <sub>2</sub> eq	1.90	2.09	2.43
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.246	0.270	0.309
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.121	0.136	0.169
ADPE	kg Sb eq	2.83E-05	3.04E-05	4.47E-05
ADPF	MJ <sub>NCV</sub>	3280	3640	4360

**TABLE 18.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, BRISBANE SOUTH AND GOLD COAST (QLD), PER M<sup>3</sup>

Parameter	Unit	ASPIRE® 40 GPa – 65 MPa	ASPIRE® 45 GPa – 80 MPa	ASPIRE® 50 GPa – 100 MPa
PERE	MJ <sub>NCV</sub>	7.96E+01	9.83E+01	1.45E+02
PERM	MJ <sub>NCV</sub>	2.12E-01	2.17E-01	3.99E-01
PERT	MJ <sub>NCV</sub>	7.99E+01	9.85E+01	1.45E+02
PENRE	MJ <sub>NCV</sub>	3.34E+03	3.70E+03	4.41E+03
PENRM	MJ <sub>NCV</sub>	2.39E+01	2.66E+01	4.23E+01
PENRT	MJ <sub>NCV</sub>	3.36E+03	3.73E+03	4.46E+03
SM	kg	1.61E+02	1.72E+02	2.70E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	1.71E+01	2.37E+01	3.69E+01
HWD	kg	6.60E-05	7.06E-05	1.15E-04
NHWD	kg	5.70E+00	6.08E+00	8.64E+00
RWD	kg	8.72E-03	9.49E-03	1.44E-02
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00



# Sunshine Coast region

Environmental profiles and parameters

# Product table list

## Sunshine Coast region

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

### Lower carbon concrete products

#### Table No. 1 and 2 .....54

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

#### Table No. 3 and 4 .....55

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

#### Table No. 5 and 6 .....56

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

#### Table No. 7 and 8 .....57

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

### Normal class concrete products

#### Table No. 9 and 10 .....58

- 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

### Concrete for special applications

#### Table No. 11 and 12 .....59

- HIGH SLUMP 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- HIGH SLUMP 80 MPa

#### Table No. 13 and 14 .....60

- STABILISED SAND 10:1
- KERB MACHINE 280kg
- KERB MACHINE 320kg
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE
- TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE

#### Table No. 15 and 16 .....61

- LEAN MIX 20:1
- NO FINES 6:1
- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- SHOTCRETE 32 MPa

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

Sunshine Coast region

ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	
177	196	213	276	319	
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
183	200	220	243	319	
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa	
239	263	272	316	418	
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa	
189	207	227	282	331	
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	
294	325	365	418	531	
HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa		
324	359	372	571		
STABILISED SAND 10:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
168	265	304	388	378	429
LEAN MIX 20:1	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa	
109	268	393	377	345	

# Sunshine Coast region

**TABLE 1.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SUNSHINE COAST (QLD), PER M<sup>3</sup>

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>177</b>	<b>196</b>	<b>213</b>	<b>276</b>	<b>319</b>
<b>ODP</b>	kg CFC11 eq	6.93E-06	7.44E-06	7.78E-06	9.28E-06	9.93E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.956	1.05	1.15	1.49	1.73
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.124	0.136	0.146	0.185	0.211
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0699	0.0757	0.0801	0.0980	0.108
<b>ADPE</b>	kg Sb eq	3.55E-06	4.12E-06	4.51E-06	5.38E-06	7.47E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1600	1750	1890	2400	2740

**TABLE 2.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SUNSHINE COAST (QLD), PER M<sup>3</sup>

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	1.86E+01	2.09E+01	2.29E+01	2.98E+01	3.61E+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>	1.86E+01	2.09E+01	2.29E+01	2.98E+01	3.61E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.66E+03	1.82E+03	1.96E+03	2.48E+03	2.82E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	2.50E+00	3.82E+00	4.84E+00	5.76E+00	9.84E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	1.66E+03	1.82E+03	1.96E+03	2.48E+03	2.83E+03
<b>SM</b>	kg	1.56E+02	1.75E+02	1.93E+02	2.62E+02	3.12E+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>	3.33E+00	3.45E+00	3.50E+00	3.71E+00	3.59E+00
<b>HWD</b>	kg	4.86E-06	1.31E-05	1.60E-05	1.93E-05	3.54E-05
<b>NHWD</b>	kg	7.12E-01	1.77E+00	2.13E+00	2.56E+00	3.43E+00
<b>RWD</b>	kg	9.54E-04	2.60E-03	3.16E-03	3.81E-03	6.78E-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



## Sunshine Coast region

**TABLE 3.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SUNSHINE COAST (QLD), 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
GWP	kg CO <sub>2</sub> eq	183	200	220	243	319
ODP	kg CFC11 eq	6.75E-06	7.05E-06	7.51E-06	7.94E-06	9.29E-06
AP	kg SO <sub>2</sub> eq	0.926	1.01	1.11	1.22	1.60
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.124	0.133	0.145	0.159	0.202
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0686	0.0725	0.0781	0.0837	0.102
ADPE	kg Sb eq	7.56E-06	8.39E-06	9.69E-06	1.09E-05	1.52E-05
ADPF	MJ <sub>NCV</sub>	1580	1700	1870	2040	2610

**TABLE 4.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SUNSHINE COAST (QLD), 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
PERE	MJ <sub>NCV</sub>	1.84E+01	2.02E+01	2.29E+01	2.56E+01	3.48E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.84E+01	2.02E+01	2.29E+01	2.56E+01	3.48E+01
PENRE	MJ <sub>NCV</sub>	1.64E+03	1.76E+03	1.93E+03	2.11E+03	2.69E+03
PENRM	MJ <sub>NCV</sub>	2.95E+00	3.28E+00	6.00E+00	6.79E+00	1.15E+01
PENRT	MJ <sub>NCV</sub>	1.64E+03	1.77E+03	1.94E+03	2.12E+03	2.70E+03
SM	kg	1.44E+02	1.60E+02	1.78E+02	2.01E+02	2.75E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.32E+00	3.32E+00	3.46E+00	3.48E+00	3.54E+00
HWD	kg	8.81E-06	9.83E-06	1.33E-05	1.51E-05	2.30E-05
NHWD	kg	1.82E+00	2.03E+00	2.22E+00	2.51E+00	3.42E+00
RWD	kg	1.87E-03	2.09E-03	2.73E-03	3.09E-03	4.64E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Sunshine Coast region

**TABLE 5. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SUNSHINE COAST (QLD), 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
GWP	kg CO <sub>2</sub> eq	239	263	272	316	418
ODP	kg CFC11 eq	6.74E-06	7.05E-06	7.29E-06	7.85E-06	9.16E-06
AP	kg SO <sub>2</sub> eq	0.985	1.08	1.11	1.29	1.68
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.142	0.154	0.160	0.182	0.233
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0705	0.0747	0.0774	0.0852	0.104
ADPE	kg Sb eq	3.54E-06	3.91E-06	4.48E-06	5.20E-06	7.36E-06
ADPF	MJ <sub>NCV</sub>	1730	1870	1940	2210	2840

**TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SUNSHINE COAST (QLD), 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
PERE	MJ <sub>NCV</sub>	1.67E+01	1.84E+01	1.96E+01	2.27E+01	3.07E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.67E+01	1.84E+01	1.96E+01	2.27E+01	3.07E+01
PENRE	MJ <sub>NCV</sub>	1.78E+03	1.93E+03	2.00E+03	2.28E+03	2.91E+03
PENRM	MJ <sub>NCV</sub>	2.46E+00	2.75E+00	4.75E+00	5.66E+00	9.63E+00
PENRT	MJ <sub>NCV</sub>	1.79E+03	1.93E+03	2.01E+03	2.28E+03	2.92E+03
SM	kg	6.45E+01	7.28E+01	7.59E+01	9.05E+01	1.23E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.47E+00	3.50E+00	3.63E+00	3.69E+00	3.82E+00
HWD	kg	4.78E-06	5.32E-06	7.54E-06	8.66E-06	1.39E-05
NHWD	kg	6.64E-01	7.37E-01	7.74E-01	9.09E-01	1.24E+00
RWD	kg	9.39E-04	1.05E-03	1.44E-03	1.66E-03	2.63E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Sunshine Coast region

**TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, SUNSHINE COAST (QLD), 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
GWP	kg CO <sub>2</sub> eq	189	207	227	282	331
ODP	kg CFC11 eq	6.66E-06	6.96E-06	7.39E-06	8.43E-06	9.15E-06
AP	kg SO <sub>2</sub> eq	0.906	0.992	1.08	1.34	1.57
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.124	0.134	0.146	0.177	0.204
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0674	0.0714	0.0766	0.0896	0.0998
ADPE	kg Sb eq	3.46E-06	3.80E-06	4.56E-06	5.18E-06	7.22E-06
ADPF	MJ <sub>NCV</sub>	1550	1680	1830	2220	2570

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, SUNSHINE COAST (QLD), 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
PERE	MJ <sub>NCV</sub>	1.61E+01	1.78E+01	2.00E+01	2.47E+01	3.02E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.61E+01	1.78E+01	2.00E+01	2.47E+01	3.02E+01
PENRE	MJ <sub>NCV</sub>	1.61E+03	1.74E+03	1.90E+03	2.30E+03	2.65E+03
PENRM	MJ <sub>NCV</sub>	2.46E+00	2.73E+00	5.00E+00	5.66E+00	9.63E+00
PENRT	MJ <sub>NCV</sub>	1.62E+03	1.74E+03	1.90E+03	2.30E+03	2.66E+03
SM	kg	1.30E+02	1.46E+02	1.61E+02	2.08E+02	2.50E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.33E+00	3.33E+00	3.48E+00	3.58E+00	3.56E+00
HWD	kg	4.78E-06	5.30E-06	7.65E-06	8.66E-06	1.39E-05
NHWD	kg	6.77E-01	7.53E-01	8.27E-01	9.41E-01	1.26E+00
RWD	kg	9.39E-04	1.04E-03	1.47E-03	1.66E-03	2.63E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 9.** ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, SUNSHINE COAST (QLD), 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
GWP	kg CO <sub>2</sub> eq	294	325	365	418	531
ODP	kg CFC11 eq	7.34E-06	7.74E-06	8.41E-06	9.06E-06	1.04E-05
AP	kg SO <sub>2</sub> eq	1.20	1.32	1.48	1.69	2.12
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.169	0.185	0.207	0.233	0.290
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0793	0.0850	0.0933	0.0903	0.122
ADPE	kg Sb eq	3.69E-06	4.07E-06	4.73E-06	5.47E-06	7.66E-06
ADPF	MJ <sub>NCV</sub>	2040	2240	2490	2810	3500

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, SUNSHINE COAST (QLD), 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
PERE	MJ <sub>NCV</sub>	2.02E+01	2.24E+01	2.56E+01	2.93E+01	3.80E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.02E+01	2.24E+01	2.56E+01	2.93E+01	3.80E+01
PENRE	MJ <sub>NCV</sub>	2.11E+03	2.30E+03	2.56E+03	2.89E+03	3.59E+03
PENRM	MJ <sub>NCV</sub>	2.46E+00	2.75E+00	4.75E+00	5.66E+00	9.63E+00
PENRT	MJ <sub>NCV</sub>	2.11E+03	2.31E+03	2.57E+03	2.90E+03	3.60E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.63E+00	3.68E+00	3.90E+00	3.98E+00	4.14E+00
HWD	kg	4.78E-06	5.32E-06	7.54E-06	8.66E-06	1.39E-05
NHWD	kg	6.75E-01	7.51E-01	7.94E-01	9.31E-01	1.26E+00
RWD	kg	9.39E-04	1.05E-03	1.44E-03	1.66E-03	2.63E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 11. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SUNSHINE COAST (QLD), PER M<sup>3</sup>**

Indicator	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
GWP	kg CO <sub>2</sub> eq	324	359	372	571
ODP	kg CFC11 eq	9.24E-06	9.83E-06	9.61E-06	1.14E-05
AP	kg SO <sub>2</sub> eq	1.55	1.69	1.66	2.29
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.202	0.221	0.221	0.313
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.100	0.108	0.106	0.135
ADPE	kg Sb eq	1.07E-05	5.13E-06	1.61E-05	2.61E-05
ADPF	MJ <sub>NCV</sub>	2570	2800	2760	3850

**TABLE 12. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SUNSHINE COAST (QLD), PER M<sup>3</sup>**

Parameter	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
PERE	MJ <sub>NCV</sub>	3.17E+01	3.35E+01	3.49E+01	5.17E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	9.29E-02	2.05E-01
PERT	MJ <sub>NCV</sub>	3.17E+01	3.35E+01	3.50E+01	5.19E+01
PENRE	MJ <sub>NCV</sub>	2.64E+03	2.88E+03	2.84E+03	3.94E+03
PENRM	MJ <sub>NCV</sub>	1.31E+01	1.47E+01	6.88E+00	1.52E+01
PENRT	MJ <sub>NCV</sub>	2.66E+03	2.89E+03	2.85E+03	3.96E+03
SM	kg	2.50E+02	2.70E+02	2.38E+02	1.27E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.71E+00	3.80E+00	3.84E+00	4.34E+00
HWD	kg	2.01E-05	1.86E-05	2.88E-05	5.57E-05
NHWD	kg	2.03E+00	2.58E-01	3.66E+00	5.57E+00
RWD	kg	3.86E-03	3.16E-03	4.02E-03	7.04E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 13.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SUNSHINE COAST (QLD), PER M<sup>3</sup>

Indicator	Unit	STABILISED SAND 10:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
GWP	kg CO <sub>2</sub> eq	168	265	304	388	378	429
ODP	kg CFC11 eq	5.79E-06	7.24E-06	7.73E-06	8.77E-06	8.71E-06	9.33E-06
AP	kg SO <sub>2</sub> eq	0.704	1.09	1.24	1.57	1.53	1.73
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.105	0.156	0.176	0.218	0.214	0.239
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0573	0.0764	0.0833	0.0989	0.0969	0.107
ADPE	kg Sb eq	6.60E-07	4.05E-06	4.69E-06	1.39E-05	6.50E-06	1.54E-05
ADPF	MJ <sub>NCV</sub>	1270	1890	2130	2680	2600	2930

**TABLE 14.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SUNSHINE COAST (QLD), PER M<sup>3</sup>

Parameter	Unit	STABILISED SAND 10:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
PERE	MJ <sub>NCV</sub>	1.05E+01	1.86E+01	2.14E+01	3.09E+01	2.76E+01	3.42E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.35E-02	1.08E-01
PERT	MJ <sub>NCV</sub>	1.05E+01	1.86E+01	2.14E+01	3.09E+01	2.76E+01	3.42E+01
PENRE	MJ <sub>NCV</sub>	1.32E+03	1.95E+03	2.20E+03	2.75E+03	2.67E+03	3.01E+03
PENRM	MJ <sub>NCV</sub>	0.00E+00	3.44E+00	4.06E+00	9.99E+00	8.03E+00	1.09E+01
PENRT	MJ <sub>NCV</sub>	1.32E+03	1.96E+03	2.20E+03	2.76E+03	2.68E+03	3.02E+03
SM	kg	5.41E+01	7.28E+01	8.63E+01	1.12E+02	1.14E+02	1.09E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.01E+00	3.52E+00	3.54E+00	3.76E+00	3.81E+00	3.85E+00
HWD	kg	0.00E+00	6.06E-06	7.10E-06	2.04E-05	1.18E-05	2.25E-05
NHWD	kg	6.24E-02	7.40E-01	8.66E-01	3.09E+00	1.10E+00	3.44E+00
RWD	kg	0.00E+00	1.17E-03	1.38E-03	4.14E-03	2.24E-03	4.57E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

## Sunshine Coast region

**TABLE 15.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, SUNSHINE COAST (QLD), PER M<sup>3</sup>

Indicator	Unit	LEAN MIX 20:1	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 2@4	SHOTCRETE 32 MPa
GWP	kg CO <sub>2</sub> eq	109	268	393	377	345
ODP	kg CFC11 eq	4.94E-06	6.06E-06	8.83E-06	8.65E-06	8.25E-06
AP	kg SO <sub>2</sub> eq	0.472	1.08	1.59	1.53	1.40
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0756	0.152	0.221	0.213	0.196
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0458	0.0671	0.0991	0.0963	0.0907
ADPE	kg Sb eq	6.62E-07	1.04E-06	6.51E-06	6.24E-06	5.63E-06
ADPF	MJ <sub>NCV</sub>	920	1810	2680	2580	2380

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

Parameter	Unit	LEAN MIX 20:1	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
PERE	MJ <sub>NCV</sub>	6.99E+00	1.75E+01	2.83E+01	2.72E+01	2.47E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	6.99E+00	1.75E+01	2.83E+01	2.72E+01	2.45E+03
PENRE	MJ <sub>NCV</sub>	9.64E+02	1.86E+03	2.75E+03	2.65E+03	2.40E+03
PENRM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	7.21E+00	6.88E+00	6.23E+00
PENRT	MJ <sub>NCV</sub>	9.64E+02	1.86E+03	2.76E+03	2.66E+03	2.46E+03
SM	kg	2.39E+01	0.00E+00	1.14E+02	1.09E+02	9.88E+01
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.22E+00	2.92E+00	3.77E+00	3.77E+00	3.64E+00
HWD	kg	0.00E+00	0.00E+00	1.10E-05	1.05E-05	9.54E-06
NHWD	kg	5.67E-02	8.82E-02	1.15E+00	1.10E+00	9.96E-01
RWD	kg	0.00E+00	0.00E+00	2.12E-03	2.03E-03	1.83E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00



# Darling Downs region

Environmental profiles and parameters



# Product table list

## Darling Downs region

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

### Lower carbon concrete products

#### Table No. 1 and 2 .....65

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

#### Table No. 3 and 4 .....66

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

#### Table No. 5 and 6 .....67

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

#### Table No. 7 and 8 .....68

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

### Normal class concrete products

#### Table No.9 and 10 .....69

- 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

### Concrete for special applications

#### Table No. 11 and 12 .....70

- HIGH SLUMP 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa

#### Table No. 13 and 14 .....71

- STABILISED SAND 12:1
- KERB MACHINE 280kg
- KERB MACHINE 320kg
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE
- TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE

#### Table No. 15 and 16 .....72

- NO FINES 6:1
- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- SHOTCRETE 32 MPa

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

Darling Downs region

ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa		
<b>174</b>	<b>192</b>	<b>209</b>	<b>285</b>	<b>360</b>		
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa		
<b>194</b>	<b>208</b>	<b>232</b>	<b>251</b>	<b>312</b>		
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa		
<b>242</b>	<b>266</b>	<b>299</b>	<b>364</b>	<b>430</b>		
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa		
<b>197</b>	<b>217</b>	<b>243</b>	<b>294</b>	<b>345</b>		
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>311</b>	<b>333</b>	<b>376</b>	<b>463</b>	<b>550</b>		
HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa				
<b>392</b>	<b>430</b>	<b>560</b>				
STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MTRS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MTRS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MTRS70 / 50 MPa 20mm TREMIE B2 EXPOSURE	
<b>143</b>	<b>257</b>	<b>289</b>	<b>393</b>	<b>373</b>	<b>404</b>	
NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa			
<b>253</b>	<b>394</b>	<b>386</b>	<b>355</b>			

# Darling Downs region

**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, DARLING DOWNS (QLD), PER M<sup>3</sup>**

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>174</b>	<b>192</b>	<b>209</b>	<b>285</b>	<b>360</b>
<b>ODP</b>	kg CFC11 eq	5.50E-06	5.88E-06	6.26E-06	7.99E-06	9.74E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.923	1.02	1.11	1.52	1.93
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.118	0.129	0.139	0.186	0.232
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0583	0.0631	0.0679	0.0890	0.110
<b>ADPE</b>	kg Sb eq	7.60E-06	8.64E-06	9.75E-06	1.23E-05	1.47E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1550	1700	1840	2460	3070

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, DARLING DOWNS (QLD), PER M<sup>3</sup>**

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	2.26E+01	2.49E+01	2.73E+01	3.66E+01	4.58E+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>	2.26E+01	2.49E+01	2.73E+01	3.66E+01	4.58E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.60E+03	1.75E+03	1.89E+03	2.52E+03	3.15E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	6.12E+00	6.99E+00	8.22E+00	1.17E+01	1.51E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	1.61E+03	1.75E+03	1.90E+03	2.53E+03	3.17E+03
<b>SM</b>	kg	1.56E+02	1.75E+02	1.93E+02	2.75E+02	3.56E+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>	3.70E+00	3.71E+00	3.71E+00	3.83E+00	3.99E+00
<b>HWD</b>	kg	1.16E-05	1.33E-05	1.53E-05	2.05E-05	2.54E-05
<b>NHWD</b>	kg	1.72E+00	1.96E+00	2.19E+00	2.69E+00	3.13E+00
<b>RWD</b>	kg	2.33E-03	2.66E-03	3.06E-03	4.05E-03	4.98E-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

# Darling Downs region

**TABLE 3. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, DARLING DOWNS (QLD), 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
GWP	kg CO <sub>2</sub> eq	194	208	232	251	312
ODP	kg CFC11 eq	5.48E-06	5.77E-06	6.26E-06	5.82E-06	6.80E-06
AP	kg SO <sub>2</sub> eq	0.954	1.03	1.15	1.07	1.32
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.126	0.134	0.148	0.148	0.180
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0589	0.0626	0.0687	0.0652	0.0780
ADPE	kg Sb eq	6.64E-06	7.31E-06	8.22E-06	9.89E-06	1.27E-05
ADPF	MJ <sub>NCV</sub>	1620	1730	1910	1870	2270

**TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, DARLING DOWNS (QLD), 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
PERE	MJ <sub>NCV</sub>	2.24E+01	2.40E+01	2.66E+01	2.54E+01	3.05E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.24E+01	2.40E+01	2.66E+01	2.54E+01	3.05E+01
PENRE	MJ <sub>NCV</sub>	1.67E+03	1.78E+03	1.96E+03	1.92E+03	2.32E+03
PENRM	MJ <sub>NCV</sub>	5.90E+00	6.56E+00	7.43E+00	9.18E+00	8.99E+00
PENRT	MJ <sub>NCV</sub>	1.67E+03	1.79E+03	1.97E+03	1.93E+03	2.33E+03
SM	kg	1.57E+02	1.72E+02	1.94E+02	2.40E+02	3.04E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.78E+00	3.79E+00	3.81E+00	3.77E+00	3.77E+00
HWD	kg	1.04E-05	1.15E-05	1.31E-05	1.62E-05	1.85E-05
NHWD	kg	1.43E+00	1.57E+00	1.77E+00	2.11E+00	2.89E+00
RWD	kg	2.05E-03	2.28E-03	2.58E-03	3.19E-03	3.75E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

## Darling Downs region

**TABLE 5.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, DARLING DOWNS (QLD), 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>242</b>	<b>266</b>	<b>299</b>	<b>364</b>	<b>430</b>
<b>ODP</b>	kg CFC11 eq	5.36E-06	5.72E-06	6.21E-06	7.14E-06	8.09E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.972	1.07	1.20	1.45	1.71
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.139	0.151	0.168	0.202	0.236
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0594	0.0641	0.0705	0.0830	0.0958
<b>ADPE</b>	kg Sb eq	3.37E-06	3.72E-06	4.18E-06	5.12E-06	6.25E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1690	1840	2040	2450	2860

**TABLE 6.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, DARLING DOWNS (QLD), 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>	1.92E+01	2.09E+01	2.32E+01	2.79E+01	3.29E+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>	1.92E+01	2.09E+01	2.32E+01	2.79E+01	3.29E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.73E+03	1.89E+03	2.10E+03	2.51E+03	2.93E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	3.55E+00	3.96E+00	4.51E+00	5.60E+00	7.50E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	1.74E+03	1.89E+03	2.10E+03	2.51E+03	2.94E+03
<b>SM</b>	kg	6.76E+01	7.59E+01	8.63E+01	1.07E+02	1.27E+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>	3.82E+00	3.86E+00	3.94E+00	4.01E+00	4.08E+00
<b>HWD</b>	kg	5.50E-06	6.12E-06	6.82E-06	8.47E-06	1.10E-05
<b>NHWD</b>	kg	6.21E-01	6.83E-01	7.66E-01	9.31E-01	1.10E+00
<b>RWD</b>	kg	1.05E-03	1.17E-03	1.31E-03	1.62E-03	2.09E-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

# Darling Downs region

**TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, DARLING DOWNS (QLD), 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
GWP	kg CO <sub>2</sub> eq	197	217	243	294	345
ODP	kg CFC11 eq	4.97E-06	5.31E-06	5.78E-06	6.69E-06	7.51E-06
AP	kg SO <sub>2</sub> eq	0.863	0.949	1.06	1.29	1.51
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.121	0.131	0.146	0.174	0.201
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0536	0.0580	0.0638	0.0753	0.0861
ADPE	kg Sb eq	3.41E-06	3.74E-06	4.18E-06	5.08E-06	6.15E-06
ADPF	MJ <sub>NCV</sub>	1500	1630	1810	2160	2500

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, DARLING DOWNS (QLD), 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
PERE	MJ <sub>NCV</sub>	1.84E+01	2.00E+01	2.21E+01	2.63E+01	3.07E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.84E+01	2.00E+01	2.00E+01	2.63E+01	3.07E+01
PENRE	MJ <sub>NCV</sub>	1.54E+03	1.68E+03	1.68E+03	2.21E+03	2.56E+03
PENRM	MJ <sub>NCV</sub>	3.55E+00	3.96E+00	3.96E+00	5.60E+00	7.50E+00
PENRT	MJ <sub>NCV</sub>	1.54E+03	1.68E+03	1.68E+03	2.22E+03	2.57E+03
SM	kg	1.22E+02	1.35E+02	1.35E+02	1.91E+02	2.29E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.73E+00	3.74E+00	3.74E+00	3.90E+00	3.83E+00
HWD	kg	5.50E-06	6.12E-06	6.12E-06	8.47E-06	1.10E-05
NHWD	kg	6.37E-01	6.99E-01	6.99E-01	9.48E-01	1.12E+00
RWD	kg	1.05E-03	1.17E-03	1.17E-03	1.62E-03	2.09E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

## Darling Downs region

**TABLE 9.** ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, DARLING DOWNS (QLD), 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
GWP	kg CO <sub>2</sub> eq	311	333	376	463	550
ODP	kg CFC11 eq	6.31E-06	6.61E-06	7.25E-06	8.48E-06	9.71E-06
AP	kg SO <sub>2</sub> eq	1.24	1.33	1.50	1.84	2.18
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.175	0.186	0.208	0.253	0.297
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0722	0.0763	0.0847	0.101	0.118
ADPE	kg Sb eq	3.55E-06	3.89E-06	4.38E-06	5.38E-06	6.56E-06
ADPF	MJ <sub>NCV</sub>	2110	2240	2510	3050	3590

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, DARLING DOWNS (QLD), 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
PERE	MJ <sub>NCV</sub>	2.36E+01	2.52E+01	2.82E+01	3.43E+01	4.05E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.36E+01	2.52E+01	2.82E+01	3.43E+01	4.05E+01
PENRE	MJ <sub>NCV</sub>	2.16E+03	2.30E+03	2.57E+03	3.12E+03	3.66E+03
PENRM	MJ <sub>NCV</sub>	3.55E+00	3.96E+00	4.51E+00	5.60E+00	7.50E+00
PENRT	MJ <sub>NCV</sub>	2.17E+03	2.30E+03	2.58E+03	3.12E+03	3.67E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	4.02E+00	4.05E+00	4.16E+00	4.30E+00	4.42E+00
HWD	kg	5.50E-06	6.12E-06	6.82E-06	8.47E-06	1.10E-05
NHWD	kg	6.36E-01	6.97E-01	7.82E-01	9.52E-01	1.13E+00
RWD	kg	1.05E-03	1.17E-03	1.31E-03	1.62E-03	2.09E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Darling Downs region

**TABLE 11.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, DARLING DOWNS (QLD), PER M<sup>3</sup>

Indicator	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa
GWP	kg CO <sub>2</sub> eq	392	430	560
ODP	kg CFC11 eq	7.32E-06	8.09E-06	9.86E-06
AP	kg SO <sub>2</sub> eq	1.55	1.71	2.21
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.216	0.236	0.303
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0872	0.0958	0.121
ADPE	kg Sb eq	1.08E-05	6.25E-06	1.61E-05
ADPF	MJ <sub>NCV</sub>	2650	2860	3750

**TABLE 12.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, DARLING DOWNS (QLD), PER M<sup>3</sup>

Parameter	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa
PERE	MJ <sub>NCV</sub>	3.34E+01	3.29E+01	4.88E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	3.34E+01	3.34E+01	4.88E+01
PENRE	MJ <sub>NCV</sub>	2.71E+03	2.71E+03	3.82E+03
PENRM	MJ <sub>NCV</sub>	1.31E+01	1.31E+01	2.95E+01
PENRT	MJ <sub>NCV</sub>	2.72E+03	2.72E+03	3.84E+03
SM	kg	1.04E+02	1.04E+02	1.25E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.96E+00	3.96E+00	4.20E+00
HWD	kg	2.01E-05	2.01E-05	3.89E-05
NHWD	kg	2.05E+00	2.05E+00	2.53E+00
RWD	kg	3.86E-03	3.86E-03	7.20E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00



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**TABLE 13.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, DARLING DOWNS (QLD), PER M<sup>3</sup>

Indicator	Unit	STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
GWP	kg CO <sub>2</sub> eq	143	257	289	393	373	404
ODP	kg CFC11 eq	3.54E-06	5.55E-06	5.99E-06	7.52E-06	7.28E-06	7.70E-06
AP	kg SO <sub>2</sub> eq	0.577	1.03	1.16	1.57	1.49	1.61
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.086	0.147	0.163	0.217	0.207	0.222
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0372	0.0622	0.0682	0.0892	0.0849	0.0916
ADPE	kg Sb eq	6.97E-07	3.55E-06	4.02E-06	1.41E-05	5.36E-06	1.63E-05
ADPF	MJ <sub>NCV</sub>	1050	1780	1980	2670	2510	2730

**TABLE 14.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, DARLING DOWNS (QLD), PER M<sup>3</sup>

Parameter	Unit	STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
PERE	MJ <sub>NCV</sub>	1.30E+01	2.01E+01	2.24E+01	3.41E+01	2.87E+01	3.71E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-01
PERT	MJ <sub>NCV</sub>	1.30E+01	2.01E+01	2.24E+01	3.41E+01	2.87E+01	3.72E+01
PENRE	MJ <sub>NCV</sub>	1.08E+03	1.83E+03	2.03E+03	2.73E+03	2.57E+03	2.79E+03
PENRM	MJ <sub>NCV</sub>	0.00E+00	3.82E+00	4.37E+00	1.30E+01	6.31E+00	8.92E+00
PENRT	MJ <sub>NCV</sub>	1.08E+03	1.83E+03	2.03E+03	2.74E+03	2.57E+03	2.80E+03
SM	kg	3.74E+01	7.28E+01	8.32E+01	1.14E+02	1.09E+02	1.19E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	2.98E+00	3.64E+00	3.62E+00	3.99E+00	4.01E+00	4.05E+00
HWD	kg	0.00E+00	5.92E-06	6.74E-06	2.32E-05	9.30E-06	3.33E-05
NHWD	kg	1.03E-01	6.59E-01	7.41E-01	3.02E+00	9.54E-01	3.53E+00
RWD	kg	0.00E+00	1.13E-03	1.29E-03	4.60E-03	1.77E-03	4.28E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 15.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, DARLING DOWNS (QLD), PER M<sup>3</sup>

Indicator	Unit	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
GWP	kg CO <sub>2</sub> eq	253	394	386	355
ODP	kg CFC11 eq	4.90E-06	7.53E-06	7.42E-06	6.90E-06
AP	kg SO <sub>2</sub> eq	1.00	1.57	1.54	1.41
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.142	0.217	0.213	0.197
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0564	0.0884	0.0870	0.0804
ADPE	kg Sb eq	1.06E-06	5.39E-06	5.18E-06	5.03E-06
ADPF	MJ <sub>NCV</sub>	1710	2630	2580	2390

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

Parameter	Unit	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
PERE	MJ <sub>NCV</sub>	1.90E+01	3.00E+01	2.94E+01	2.81E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	2.81E+01
PERT	MJ <sub>NCV</sub>	1.90E+01	3.00E+01	2.94E+01	0.00E+00
PENRE	MJ <sub>NCV</sub>	1.75E+03	2.69E+03	2.64E+03	2.81E+01
PENRM	MJ <sub>NCV</sub>	0.00E+00	5.87E+00	5.60E+00	2.45E+03
PENRT	MJ <sub>NCV</sub>	1.75E+03	2.70E+03	2.65E+03	5.46E+00
SM	kg	0.00E+00	9.88E+01	8.53E+01	2.45E+03
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	1.04E+02
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.21E+00	4.02E+00	4.05E+00	0.00E+00
HWD	kg	0.00E+00	8.89E-06	8.47E-06	3.82E+00
NHWD	kg	1.46E-01	9.76E-01	9.36E-01	8.27E-06
RWD	kg	0.00E+00	1.70E-03	1.62E-03	9.07E-01
CRU	kg	0.00E+00	0.00E+00	0.00E+00	1.58E-03
MFR	kg	9.60E+01	9.60E+01	9.60E+01	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	9.60E+01
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00



# Central Queensland region

Environmental profiles and parameters

# Product table list

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

### Lower carbon concrete products

#### Table No. 1 and 2 .....76

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

#### Table No. 3 and 4 .....77

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

#### Table No. 5 and 6 .....78

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

#### Table No. 7 and 8 .....79

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

### Normal class concrete products

#### Table No. 9 and 10 ..... 80

- 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

### Concrete for special applications

#### Table No. 11 and 12 .....81

- HIGH SLUMP 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- HIGH SLUMP 80 MPa

#### Table No. 13 and 14 .....82

- STABILISED SAND 12:1
- KERB MACHINE 280kg
- KERB MACHINE 320kg
- TMR MRTS70 / 40 MPa 20mm PUMP B1 EXPOSURE

#### Table No. 15 and 16 .....83

- NO FINES 6:1
- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- SHOTCRETE 32 MPa

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

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ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>167</b>	<b>182</b>	<b>202</b>	<b>237</b>	<b>352</b>
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
<b>174</b>	<b>190</b>	<b>211</b>	<b>247</b>	<b>331</b>
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa
<b>229</b>	<b>251</b>	<b>280</b>	<b>331</b>	<b>445</b>
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa
<b>180</b>	<b>196</b>	<b>218</b>	<b>256</b>	<b>344</b>
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>292</b>	<b>303</b>	<b>325</b>	<b>396</b>	<b>530</b>
HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa	
<b>368</b>	<b>440</b>	<b>464</b>	<b>588</b>	
STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B1 EXPOSURE	
<b>139</b>	<b>273</b>	<b>306</b>	<b>366</b>	
NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa	
<b>244</b>	<b>411</b>	<b>349</b>	<b>379</b>	

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**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CENTRAL QUEENSLAND, PER M<sup>3</sup>**

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>167</b>	<b>182</b>	<b>202</b>	<b>237</b>	<b>352</b>
<b>ODP</b>	kg CFC11 eq	6.07E-06	6.44E-06	6.96E-06	7.83E-06	1.08E-05
<b>AP</b>	kg SO <sub>2</sub> eq	0.896	0.975	1.09	1.28	1.90
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.115	0.123	0.136	0.158	0.229
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0617	0.0660	0.0720	0.0821	0.116
<b>ADPE</b>	kg Sb eq	4.50E-06	4.92E-06	5.51E-06	6.48E-06	9.15E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1500	1620	1790	2070	3020

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CENTRAL QUEENSLAND, PER M<sup>3</sup>**

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	1.91E+01	2.07E+01	2.31E+01	2.70E+01	4.00E+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>	1.91E+01	2.07E+01	2.31E+01	2.70E+01	4.00E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.55E+03	1.67E+03	1.85E+03	2.14E+03	3.11E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	3.93E+00	4.34E+00	4.92E+00	5.90E+00	9.73E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	1.56E+03	1.68E+03	1.85E+03	2.14E+03	3.12E+03
<b>SM</b>	kg	1.50E+02	1.65E+02	1.87E+02	2.25E+02	3.46E+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>	3.62E+00	3.63E+00	3.64E+00	3.67E+00	3.79E+00
<b>HWD</b>	kg	7.53E-06	8.23E-06	9.17E-06	1.06E-05	1.56E-05
<b>NHWD</b>	kg	9.07E-01	9.97E-01	1.12E+00	1.33E+00	1.84E+00
<b>RWD</b>	kg	1.44E-03	1.58E-03	1.77E-03	2.05E-03	3.04E-03
<b>CRU</b>	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.04E-03
<b>MFR</b>	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	0.00E+00
<b>MER</b>	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.60E+01
<b>EE</b>	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 3.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CENTRAL QUEENSLAND, 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>190</b>	<b>211</b>	<b>247</b>	<b>331</b>
<b>ODP</b>	kg CFC11 eq	5.99E-06	6.37E-06	6.90E-06	7.71E-06	9.70E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.872	0.954	1.06	1.24	1.66
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.115	0.125	0.137	0.158	0.208
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0615	0.0660	0.0721	0.0819	0.106
<b>ADPE</b>	kg Sb eq	9.91E-06	1.09E-05	1.23E-05	1.47E-05	2.04E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1490	1620	1790	2070	2730

**TABLE 4.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CENTRAL QUEENSLAND, 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>	1.93E+01	2.11E+01	2.34E+01	2.75E+01	3.74E+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>	1.93E+01	2.11E+01	2.34E+01	2.75E+01	3.74E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.55E+03	1.67E+03	1.84E+03	2.13E+03	2.81E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	4.72E+00	5.21E+00	5.90E+00	7.08E+00	1.12E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	1.55E+03	1.68E+03	1.85E+03	2.14E+03	2.82E+03
<b>SM</b>	kg	1.37E+02	1.52E+02	1.77E+02	2.06E+02	2.83E+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>	3.61E+00	3.63E+00	3.64E+00	3.67E+00	3.69E+00
<b>HWD</b>	kg	1.26E-05	1.40E-05	1.58E-05	1.90E-05	2.76E-05
<b>NHWD</b>	kg	2.41E+00	2.66E+00	3.01E+00	3.60E+00	4.94E+00
<b>RWD</b>	kg	2.66E-03	2.93E-03	3.32E-03	3.98E-03	5.75E-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 5. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CENTRAL QUEENSLAND, 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>229</b>	<b>251</b>	<b>280</b>	<b>331</b>	<b>445</b>
ODP	kg CFC11 eq	6.26E-06	6.65E-06	7.19E-06	8.11E-06	1.02E-05
AP	kg SO <sub>2</sub> eq	0.940	1.02	1.14	1.34	1.79
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.135	0.147	0.162	0.189	0.249
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0661	0.0708	0.0774	0.0886	0.115
ADPE	kg Sb eq	4.54E-06	4.97E-06	5.56E-06	6.54E-06	9.12E-06
ADPF	MJ <sub>NCV</sub>	1660	1800	1990	2310	3060

**TABLE 6. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CENTRAL QUEENSLAND, 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
PERE	MJ <sub>NCV</sub>	1.73E+01	1.88E+01	2.09E+01	2.44E+01	3.28E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.73E+01	1.88E+01	2.09E+01	2.44E+01	3.28E+01
PENRE	MJ <sub>NCV</sub>	1.71E+03	1.85E+03	2.05E+03	2.38E+03	3.14E+03
PENRM	MJ <sub>NCV</sub>	3.93E+00	4.34E+00	4.92E+00	5.90E+00	9.73E+00
PENRT	MJ <sub>NCV</sub>	1.72E+03	1.86E+03	2.05E+03	2.38E+03	3.15E+03
SM	kg	6.24E+01	6.86E+01	7.80E+01	9.36E+01	1.29E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.76E+00	3.79E+00	3.83E+00	3.90E+00	4.00E+00
HWD	kg	7.53E-06	8.23E-06	9.17E-06	1.06E-05	1.56E-05
NHWD	kg	8.70E-01	9.56E-01	1.08E+00	1.28E+00	1.75E+00
RWD	kg	1.44E-03	1.58E-03	1.77E-03	2.05E-03	3.04E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00



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**TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, CENTRAL QUEENSLAND, 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
GWP	kg CO <sub>2</sub> eq	180	196	218	256	344
ODP	kg CFC11 eq	5.98E-06	6.34E-06	6.84E-06	7.68E-06	9.67E-06
AP	kg SO <sub>2</sub> eq	0.857	0.935	1.04	1.22	1.63
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.116	0.126	0.138	0.160	0.211
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0611	0.0653	0.0712	0.0811	0.104
ADPE	kg Sb eq	4.45E-06	4.87E-06	5.45E-06	6.41E-06	8.94E-06
ADPF	MJ <sub>NCV</sub>	1480	1600	1760	2040	2680

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, CENTRAL QUEENSLAND, 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
PERE	MJ <sub>NCV</sub>	1.68E+01	1.83E+01	2.02E+01	2.35E+01	3.17E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.68E+01	1.83E+01	2.02E+01	2.35E+01	3.17E+01
PENRE	MJ <sub>NCV</sub>	1.53E+03	1.65E+03	1.82E+03	2.10E+03	2.77E+03
PENRM	MJ <sub>NCV</sub>	3.93E+00	4.34E+00	4.92E+00	5.90E+00	9.73E+00
PENRT	MJ <sub>NCV</sub>	1.53E+03	1.66E+03	1.82E+03	2.11E+03	2.78E+03
SM	kg	1.25E+02	1.37E+02	1.56E+02	1.87E+02	2.57E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.62E+00	3.64E+00	3.65E+00	3.68E+00	3.70E+00
HWD	kg	7.53E-06	8.23E-06	9.17E-06	1.06E-05	1.56E-05
NHWD	kg	8.83E-01	9.71E-01	1.09E+00	1.30E+00	1.77E+00
RWD	kg	1.44E-03	1.58E-03	1.77E-03	2.05E-03	3.04E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 9.** ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, CENTRAL QUEENSLAND, 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
GWP	kg CO <sub>2</sub> eq	292	303	325	396	530
ODP	kg CFC11 eq	6.91E-06	7.07E-06	7.43E-06	8.60E-06	1.08E-05
AP	kg SO <sub>2</sub> eq	1.18	1.23	1.31	1.60	2.12
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.166	0.172	0.184	0.221	0.291
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0760	0.0781	0.0827	0.0976	0.126
ADPE	kg Sb eq	4.70E-06	5.10E-06	5.68E-06	6.72E-06	9.34E-06
ADPF	MJ <sub>NCV</sub>	2020	2090	2230	2680	3530

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, CENTRAL QUEENSLAND, 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
PERE	MJ <sub>NCV</sub>	2.14E+01	2.23E+01	2.39E+01	2.87E+01	3.85E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.14E+01	2.23E+01	2.39E+01	2.87E+01	3.85E+01
PENRE	MJ <sub>NCV</sub>	2.08E+03	2.15E+03	2.29E+03	2.75E+03	3.62E+03
PENRM	MJ <sub>NCV</sub>	3.93E+00	4.34E+00	4.92E+00	5.90E+00	9.73E+00
PENRT	MJ <sub>NCV</sub>	2.09E+03	2.16E+03	2.30E+03	2.76E+03	3.63E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.94E+00	3.94E+00	3.96E+00	4.09E+00	4.24E+00
HWD	kg	7.53E-06	8.23E-06	9.17E-06	1.06E-05	1.56E-05
NHWD	kg	8.83E-01	9.67E-01	1.09E+00	1.29E+00	1.76E+00
RWD	kg	1.44E-03	1.58E-03	1.77E-03	2.05E-03	3.04E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 11.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CENTRAL QUEENSLAND, PER M<sup>3</sup>

Indicator	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>368</b>	<b>440</b>	<b>464</b>	<b>588</b>
<b>ODP</b>	kg CFC11 eq	8.63E-06	9.50E-06	1.04E-05	1.23E-05
<b>AP</b>	kg SO <sub>2</sub> eq	1.48	1.76	1.89	2.39
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.208	0.244	0.259	0.322
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0961	0.108	0.119	0.145
<b>ADPE</b>	kg Sb eq	1.03E-05	5.17E-06	2.09E-05	3.73E-05
<b>ADPF</b>	Mj <sub>NCV</sub>	2590	3000	3180	4000

**TABLE 12.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CENTRAL QUEENSLAND, PER M<sup>3</sup>

Parameter	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
<b>PERE</b>	Mj <sub>NCV</sub>	3.04E+01	3.33E+01	3.67E+01	5.04E+01
<b>PERM</b>	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	2.48E-02	4.40E-02
<b>PERT</b>	Mj <sub>NCV</sub>	3.04E+01	3.33E+01	3.68E+01	5.04E+01
<b>PENRE</b>	Mj <sub>NCV</sub>	2.65E+03	3.07E+03	3.27E+03	4.10E+03
<b>PENRM</b>	Mj <sub>NCV</sub>	1.75E+01	1.47E+01	1.84E+00	3.26E+00
<b>PENRT</b>	Mj <sub>NCV</sub>	2.67E+03	3.09E+03	3.27E+03	4.10E+03
<b>SM</b>	kg	1.04E+02	1.04E+02	9.36E+01	8.32E+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>	3.97E+00	3.96E+00	4.02E+00	4.28E+00
<b>HWD</b>	kg	2.36E-05	1.86E-05	2.23E-05	4.05E-05
<b>NHWD</b>	kg	1.65E+00	2.28E-01	5.47E+00	9.90E+00
<b>RWD</b>	kg	4.39E-03	3.16E-03	4.50E-03	8.18E-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 13.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CENTRAL QUEENSLAND, PER M<sup>3</sup>

Indicator	Unit	STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MTRS70 / 40 MPa 20mm PUMP B1 EXPOSURE
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>139</b>	<b>273</b>	<b>306</b>	<b>366</b>
<b>ODP</b>	kg CFC11 eq	4.29E-06	7.33E-06	7.89E-06	8.81E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.575	1.12	1.25	1.48
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.085	0.159	0.177	0.208
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0434	0.0779	0.0850	0.0969
<b>ADPE</b>	kg Sb eq	5.37E-07	5.29E-06	5.98E-06	7.52E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1020	1960	2170	2540

**TABLE 14.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CENTRAL QUEENSLAND, PER M<sup>3</sup>

Parameter	Unit	STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MTRS70 / 40 MPa 20mm PUMP B1 EXPOSURE
<b>PERE</b>	MJ <sub>NCV</sub>	9.00E+00	2.03E+01	2.27E+01	2.71E+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>	9.00E+00	2.03E+01	2.27E+01	2.71E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.06E+03	2.02E+03	2.24E+03	2.62E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	0.00E+00	4.75E+00	5.41E+00	8.20E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	1.06E+03	2.03E+03	2.24E+03	2.63E+03
<b>SM</b>	kg	4.68E+01	7.59E+01	8.63E+01	1.04E+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>	2.53E+00	3.75E+00	3.80E+00	3.95E+00
<b>HWD</b>	kg	0.00E+00	8.67E-06	9.80E-06	1.30E-05
<b>NHWD</b>	kg	5.74E-02	1.04E+00	1.17E+00	1.42E+00
<b>RWD</b>	kg	0.00E+00	1.68E-03	1.90E-03	2.52E-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

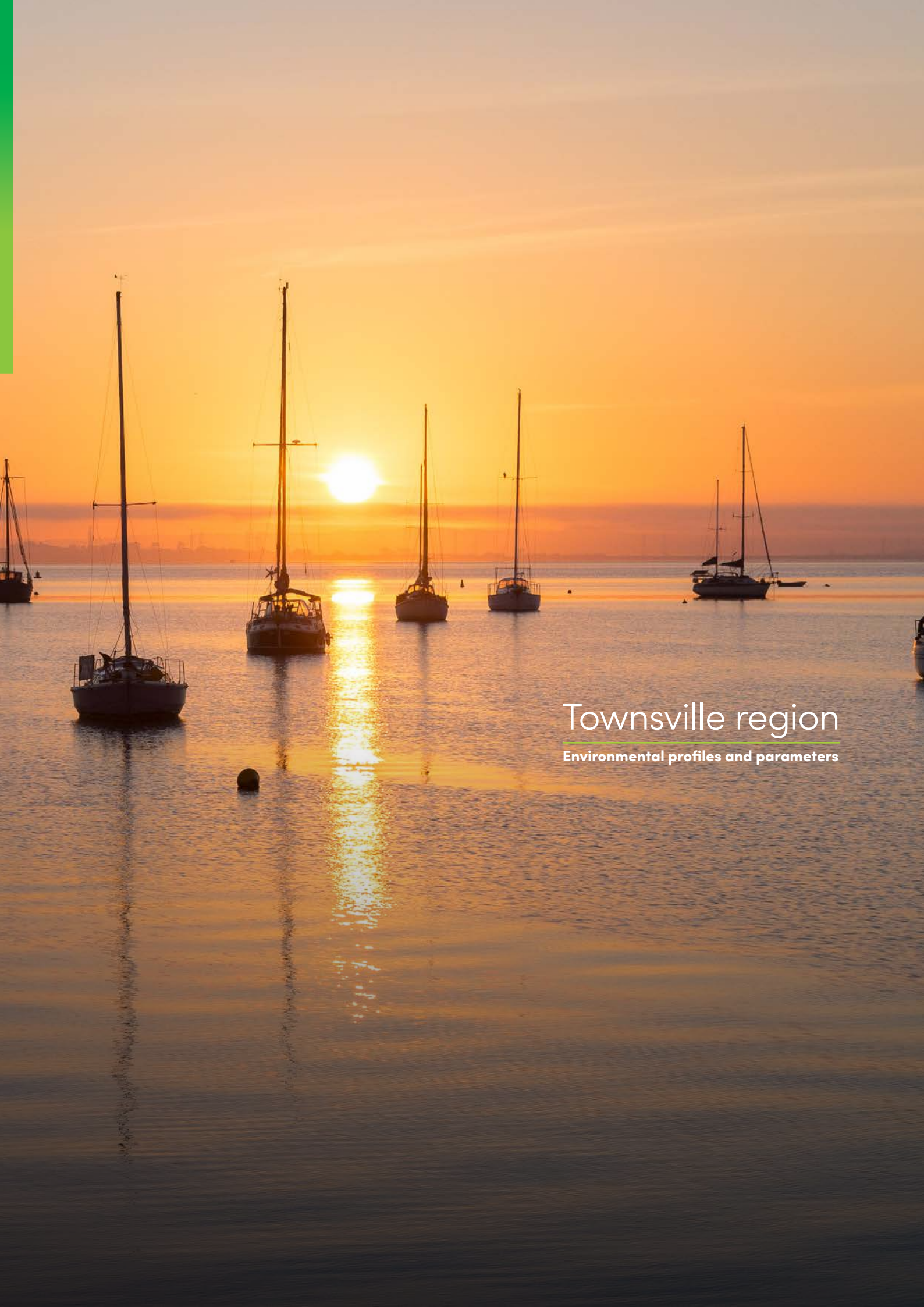
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**TABLE 15.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, CENTRAL QUEENSLAND, PER M<sup>3</sup>

Indicator	Unit	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
GWP	kg CO <sub>2</sub> eq	244	411	349	379
ODP	kg CFC11 eq	4.84E-06	9.26E-06	8.64E-06	8.70E-06
AP	kg SO <sub>2</sub> eq	0.980	1.66	1.42	1.53
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.135	0.230	0.199	0.213
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0558	0.104	0.0942	0.0972
ADPE	kg Sb eq	9.58E-07	7.71E-06	6.79E-06	7.55E-06
ADPF	MJ <sub>NCV</sub>	1610	2800	2440	2610

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

Parameter	Unit	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
PERE	MJ <sub>NCV</sub>	1.65E+01	3.00E+01	2.55E+01	2.81E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.65E+01	3.00E+01	2.55E+01	2.81E+01
PENRE	MJ <sub>NCV</sub>	1.65E+03	2.88E+03	2.51E+03	2.68E+03
PENRM	MJ <sub>NCV</sub>	0.00E+00	7.05E+00	6.23E+00	6.88E+00
PENRT	MJ <sub>NCV</sub>	1.65E+03	2.89E+03	2.52E+03	2.68E+03
SM	kg	0.00E+00	8.94E+01	9.88E+01	1.09E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.07E+00	3.97E+00	3.97E+00	3.87E+00
HWD	kg	0.00E+00	1.21E-05	1.07E-05	1.23E-05
NHWD	kg	9.02E-02	1.52E+00	1.34E+00	1.48E+00
RWD	kg	0.00E+00	2.38E-03	2.10E-03	2.40E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00



# Townsville region

Environmental profiles and parameters

# Product table list

## Townsville region

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

### Lower carbon concrete products

#### Table No. 1 and 2 .....87

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

#### Table No. 3 and 4 .....88

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

#### Table No. 5 and 6 .....89

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

#### Table No. 7 and 8 ..... 90

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

### Normal class concrete products

#### Table No. 9 and 10 .....91

- 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

### Concrete for special applications

#### Table No. 11 and 12 .....92

- HIGH SLUMP 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- HIGH SLUMP 80 MPa

#### Table No. 13 and 14 .....93

- STABILISED SAND 12:1
- KERB MACHINE 280kg
- KERB MACHINE 320kg
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE
- TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE

#### Table No. 15 and 16 .....94

- NO FINES 6:1
- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- SHOTCRETE 32 MPa

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

Townsville region

ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	
164	180	196	244	296	
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
169	183	191	234	280	
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa	
215	236	247	304	367	
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa	
172	189	197	240	288	
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	
265	290	328	372	464	
HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa		
294	325	336	513		
STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MTRS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MTRS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MTRS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
121	254	281	313	328	365
NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa		
224	339	310	330		



# Townsville region

**TABLE 1.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, TOWNSVILLE (QLD), PER M<sup>3</sup>

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>164</b>	<b>180</b>	<b>196</b>	<b>244</b>	<b>296</b>
ODP	kg CFC11 eq	5.17E-06	5.45E-06	5.74E-06	6.61E-06	7.54E-06
AP	kg SO <sub>2</sub> eq	0.723	0.791	0.859	1.06	1.29
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.109	0.118	0.128	0.155	0.185
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0511	0.0545	0.0579	0.0683	0.0797
ADPE	kg Sb eq	4.55E-06	5.03E-06	5.29E-06	6.51E-06	8.59E-06
ADPF	MJ <sub>NCV</sub>	1460	1590	1710	2090	2510

**TABLE 2.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, TOWNSVILLE (QLD), PER M<sup>3</sup>

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
PERE	MJ <sub>NCV</sub>	2.22E+01	2.43E+01	2.63E+01	3.24E+01	3.95E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.22E+01	2.43E+01	2.63E+01	3.24E+01	3.95E+01
PENRE	MJ <sub>NCV</sub>	1.51E+03	1.63E+03	1.76E+03	2.14E+03	2.57E+03
PENRM	MJ <sub>NCV</sub>	8.10E+00	9.09E+00	9.59E+00	1.21E+01	1.49E+01
PENRT	MJ <sub>NCV</sub>	1.52E+03	1.64E+03	1.77E+03	2.16E+03	2.58E+03
SM	kg	1.56E+02	1.75E+02	1.93E+02	2.50E+02	3.12E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.14E+00	3.14E+00	3.16E+00	3.18E+00	3.18E+00
HWD	kg	1.02E-05	1.14E-05	1.20E-05	1.51E-05	1.93E-05
NHWD	kg	6.57E-01	7.30E-01	7.73E-01	9.62E-01	1.38E+00
RWD	kg	1.86E-03	2.09E-03	2.20E-03	2.77E-03	3.57E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 3. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, TOWNSVILLE (QLD), 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>169</b>	<b>183</b>	<b>191</b>	<b>234</b>	<b>280</b>
ODP	kg CFC11 eq	4.94E-06	5.15E-06	5.28E-06	5.95E-06	6.66E-06
AP	kg SO <sub>2</sub> eq	0.666	0.721	0.749	0.908	1.08
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.108	0.116	0.120	0.143	0.169
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0481	0.0508	0.0522	0.0603	0.0692
ADPE	kg Sb eq	8.02E-06	8.91E-06	9.36E-06	1.16E-05	1.63E-05
ADPF	MJ <sub>NCV</sub>	1430	1540	1600	1920	2270

**TABLE 4. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, TOWNSVILLE (QLD), 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
PERE	MJ <sub>NCV</sub>	2.21E+01	2.40E+01	2.50E+01	3.04E+01	3.71E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.21E+01	2.40E+01	2.50E+01	3.04E+01	3.71E+01
PENRE	MJ <sub>NCV</sub>	1.48E+03	1.59E+03	1.64E+03	1.97E+03	2.32E+03
PENRM	MJ <sub>NCV</sub>	9.71E+00	1.09E+01	1.15E+01	1.45E+01	1.79E+01
PENRT	MJ <sub>NCV</sub>	1.49E+03	1.60E+03	1.65E+03	1.98E+03	2.34E+03
SM	kg	1.42E+02	1.57E+02	1.66E+02	2.09E+02	2.58E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.11E+00	3.11E+00	3.11E+00	3.11E+00	3.09E+00
HWD	kg	1.48E-05	1.67E-05	1.76E-05	2.21E-05	2.93E-05
NHWD	kg	1.54E+00	1.72E+00	1.81E+00	2.27E+00	3.39E+00
RWD	kg	2.85E-03	3.20E-03	3.37E-03	4.25E-03	5.71E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 5.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, TOWNSVILLE (QLD), 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
GWP	kg CO <sub>2</sub> eq	215	236	247	304	367
ODP	kg CFC11 eq	4.44E-06	4.64E-06	4.74E-06	5.26E-06	5.81E-06
AP	kg SO <sub>2</sub> eq	0.569	0.619	0.644	0.772	0.915
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.117	0.127	0.133	0.159	0.188
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0415	0.0438	0.0449	0.0509	0.0575
ADPE	kg Sb eq	4.54E-06	5.01E-06	5.25E-06	6.44E-06	8.49E-06
ADPF	Mj <sub>NCV</sub>	1490	1620	1690	2020	2400

**TABLE 6.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, TOWNSVILLE (QLD), 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
PERE	Mj <sub>NCV</sub>	2.03E+01	2.21E+01	2.31E+01	2.79E+01	3.35E+01
PERM	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj <sub>NCV</sub>	2.03E+01	2.21E+01	2.31E+01	2.79E+01	3.35E+01
PENRE	Mj <sub>NCV</sub>	1.53E+03	1.66E+03	1.73E+03	2.06E+03	2.44E+03
PENRM	Mj <sub>NCV</sub>	8.10E+00	9.09E+00	9.59E+00	1.21E+01	1.49E+01
PENRT	Mj <sub>NCV</sub>	1.54E+03	1.67E+03	1.74E+03	2.08E+03	2.46E+03
SM	kg	6.34E+01	7.18E+01	7.59E+01	9.46E+01	1.16E+02
RSF	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.12E+00	3.12E+00	3.12E+00	3.13E+00	3.11E+00
HWD	kg	1.02E-05	1.14E-05	1.20E-05	1.51E-05	1.93E-05
NHWD	kg	6.42E-01	7.13E-01	7.49E-01	9.28E-01	1.33E+00
RWD	kg	1.86E-03	2.09E-03	2.20E-03	2.77E-03	3.57E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Mj	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, TOWNSVILLE (QLD), 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>172</b>	<b>189</b>	<b>197</b>	<b>240</b>	<b>288</b>
ODP	kg CFC11 eq	4.72E-06	4.95E-06	5.06E-06	5.67E-06	6.31E-06
AP	kg SO <sub>2</sub> eq	0.617	0.675	0.700	0.846	1.00
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.106	0.115	0.120	0.142	0.167
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0450	0.0477	0.0490	0.0561	0.0639
ADPE	kg Sb eq	4.48E-06	4.95E-06	5.19E-06	6.36E-06	8.39E-06
ADPF	MJ <sub>NCV</sub>	1380	1500	1560	1860	2190

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, TOWNSVILLE (QLD), 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>	<b>MJ<sub>NCV</sub></b>	<b>1.96E+01</b>	<b>2.15E+01</b>	<b>2.23E+01</b>	<b>2.70E+01</b>	<b>3.23E+01</b>
<b>PERM</b>	<b>MJ<sub>NCV</sub></b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<b>PERT</b>	<b>MJ<sub>NCV</sub></b>	<b>1.96E+01</b>	<b>2.15E+01</b>	<b>2.23E+01</b>	<b>2.70E+01</b>	<b>3.23E+01</b>
<b>PENRE</b>	<b>MJ<sub>NCV</sub></b>	<b>1.42E+03</b>	<b>1.54E+03</b>	<b>1.60E+03</b>	<b>1.91E+03</b>	<b>2.24E+03</b>
<b>PENRM</b>	<b>MJ<sub>NCV</sub></b>	<b>8.10E+00</b>	<b>9.09E+00</b>	<b>9.59E+00</b>	<b>1.21E+01</b>	<b>1.49E+01</b>
<b>PENRT</b>	<b>MJ<sub>NCV</sub></b>	<b>1.43E+03</b>	<b>1.55E+03</b>	<b>1.61E+03</b>	<b>1.92E+03</b>	<b>2.26E+03</b>
<b>SM</b>	<b>kg</b>	<b>1.27E+02</b>	<b>1.42E+02</b>	<b>1.51E+02</b>	<b>1.89E+02</b>	<b>2.34E+02</b>
<b>RSF</b>	<b>MJ<sub>NCV</sub></b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<b>NRSF</b>	<b>MJ<sub>NCV</sub></b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<b>FW</b>	<b>m<sup>3</sup></b>	<b>3.09E+00</b>	<b>3.09E+00</b>	<b>3.09E+00</b>	<b>3.09E+00</b>	<b>3.06E+00</b>
<b>HWD</b>	<b>kg</b>	<b>1.02E-05</b>	<b>1.14E-05</b>	<b>1.20E-05</b>	<b>1.51E-05</b>	<b>1.93E-05</b>
<b>NHWD</b>	<b>kg</b>	<b>6.38E-01</b>	<b>7.08E-01</b>	<b>7.43E-01</b>	<b>9.21E-01</b>	<b>1.33E+00</b>
<b>RWD</b>	<b>kg</b>	<b>1.86E-03</b>	<b>2.09E-03</b>	<b>2.20E-03</b>	<b>2.77E-03</b>	<b>3.57E-03</b>
<b>CRU</b>	<b>kg</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<b>MFR</b>	<b>kg</b>	<b>9.60E+01</b>	<b>9.60E+01</b>	<b>9.60E+01</b>	<b>9.60E+01</b>	<b>9.60E+01</b>
<b>MER</b>	<b>kg</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<b>EE</b>	<b>MJ</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>

# Townsville region

**TABLE 9.** ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, TOWNSVILLE (QLD), 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>265</b>	<b>290</b>	<b>328</b>	<b>372</b>	<b>464</b>
<b>ODP</b>	kg CFC11 eq	4.48E-06	4.65E-06	4.95E-06	5.26E-06	5.91E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.666	0.719	0.803	0.900	1.10
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.137	0.148	0.165	0.185	0.225
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0448	0.0471	0.0508	0.0551	0.0638
<b>ADPE</b>	kg Sb eq	4.66E-06	5.14E-06	5.44E-06	6.60E-06	8.72E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1760	1900	2120	2370	2900

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, TOWNSVILLE (QLD), 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>	2.41E+01	2.62E+01	2.92E+01	3.31E+01	4.09E+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>	2.41E+01	2.62E+01	2.92E+01	3.31E+01	4.09E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.79E+03	1.94E+03	2.16E+03	2.42E+03	2.95E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	8.10E+00	9.09E+00	9.59E+00	1.21E+01	1.49E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	1.80E+03	1.94E+03	2.17E+03	2.43E+03	2.97E+03
<b>SM</b>	kg	2.13E-03	2.36E-03	2.71E-03	3.11E-03	3.96E-03
<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	3.18E+00	3.21E+00	3.20E+00	3.22E+00
<b>HWD</b>	kg	1.02E-05	1.14E-05	1.20E-05	1.51E-05	1.93E-05
<b>NHWD</b>	kg	6.71E-01	7.44E-01	7.94E-01	9.67E-01	1.39E+00
<b>RWD</b>	kg	1.86E-03	2.09E-03	2.20E-03	2.77E-03	3.57E-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

# Townsville region

**TABLE 11.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, TOWNSVILLE (QLD), PER M<sup>3</sup>

Indicator	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
GWP	kg CO <sub>2</sub> eq	294	325	336	513
ODP	kg CFC11 eq	6.39E-06	6.77E-06	6.49E-06	6.91E-06
AP	kg SO <sub>2</sub> eq	1.04	1.13	1.05	1.28
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.171	0.187	0.185	0.252
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0652	0.0692	0.0655	0.0741
ADPE	kg Sb eq	1.08E-05	5.25E-06	2.09E-05	3.73E-05
ADPF	MJ <sub>NCV</sub>	2250	2440	2390	3270

**TABLE 12.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, TOWNSVILLE (QLD), PER M<sup>3</sup>

Parameter	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
PERE	MJ <sub>NCV</sub>	3.35E+01	3.53E+01	3.61E+01	5.17E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	2.48E-02	4.40E-02
PERT	MJ <sub>NCV</sub>	3.35E+01	3.53E+01	3.61E+01	5.18E+01
PENRE	MJ <sub>NCV</sub>	2.30E+03	2.50E+03	2.45E+03	3.33E+03
PENRM	MJ <sub>NCV</sub>	1.31E+01	1.47E+01	1.84E+00	3.26E+00
PENRT	MJ <sub>NCV</sub>	2.31E+03	2.51E+03	2.45E+03	3.34E+03
SM	kg	2.50E+02	2.70E+02	2.38E+02	1.27E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.15E+00	3.17E+00	3.16E+00	3.25E+00
HWD	kg	2.01E-05	1.86E-05	2.23E-05	4.05E-05
NHWD	kg	2.11E+00	3.51E-01	5.59E+00	1.01E+01
RWD	kg	3.86E-03	3.16E-03	4.50E-03	8.18E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Townsville region

**TABLE 13. ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, TOWNSVILLE (QLD), PER M<sup>3</sup>**

Indicator	Unit	STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
GWP	kg CO <sub>2</sub> eq	121	254	281	313	328	365
ODP	kg CFC11 eq	3.17E-06	4.75E-06	4.94E-06	5.48E-06	5.43E-06	5.98E-06
AP	kg SO <sub>2</sub> eq	0.338	0.656	0.717	0.817	0.826	0.925
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.0694	0.135	0.147	0.164	0.170	0.188
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0283	0.0452	0.0475	0.0540	0.0530	0.0584
ADPE	kg Sb eq	5.05E-07	4.63E-06	4.48E-06	2.15E-05	6.70E-06	1.32E-05
ADPF	Mj <sub>NCV</sub>	900	1710	1860	2120	2160	2380

**TABLE 14. ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, TOWNSVILLE (QLD), PER M<sup>3</sup>**

Parameter	Unit	STABILISED SAND 12:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
PERE	Mj <sub>NCV</sub>	1.13E+01	2.30E+01	2.44E+01	3.49E+01	2.96E+01	3.47E+01
PERM	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	1.15E-01	0.00E+00	8.66E-02
PERT	Mj <sub>NCV</sub>	1.13E+01	2.30E+01	2.44E+01	3.50E+01	2.96E+01	3.48E+01
PENRE	Mj <sub>NCV</sub>	9.25E+02	1.75E+03	1.90E+03	2.16E+03	2.20E+03	2.43E+03
PENRM	Mj <sub>NCV</sub>	0.00E+00	6.31E+00	4.09E+00	8.56E+00	1.20E+01	6.42E+00
PENRT	Mj <sub>NCV</sub>	9.25E+02	1.76E+03	1.91E+03	2.17E+03	2.21E+03	2.44E+03
SM	kg	4.16E+01	7.80E+01	8.84E+01	1.25E+02	1.04E+02	1.50E+02
RSF	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Mj <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	2.79E+00	3.15E+00	3.00E+00	3.09E+00	3.11E+00	3.08E+00
HWD	kg	0.00E+00	9.35E-06	7.47E-06	3.74E-05	1.53E-05	2.48E-05
NHWD	kg	1.02E-01	7.59E-01	8.37E-01	5.08E+00	1.00E+00	2.91E+00
RWD	kg	0.00E+00	1.72E-03	1.40E-03	5.38E-03	2.81E-03	3.28E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Mj	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

# Townsville region

**TABLE 15.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, TOWNSVILLE (QLD), PER M<sup>3</sup>

Indicator	Unit	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 2@4	SHOTCRETE 32 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>224</b>	<b>339</b>	<b>310</b>	<b>330</b>
<b>ODP</b>	kg CFC11 eq	3.39E-06	5.43E-06	5.29E-06	5.56E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.560	0.846	0.786	0.826
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.115	0.174	0.162	0.169
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0338	0.0538	0.0514	0.0544
<b>ADPE</b>	kg Sb eq	1.21E-06	6.60E-06	6.58E-06	6.54E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1420	2210	2060	2180

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

Parameter	Unit	NO FINES 6:1	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	1.74E+01	3.05E+01	2.85E+01	3.02E+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>	1.74E+01	3.05E+01	2.85E+01	3.02E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.45E+03	2.26E+03	2.10E+03	2.22E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	0.00E+00	1.17E+01	1.24E+01	1.20E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	1.45E+03	2.27E+03	2.11E+03	2.24E+03
<b>SM</b>	kg	0.00E+00	1.14E+02	1.09E+02	9.88E+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>	2.43E+00	3.19E+00	3.13E+00	3.03E+00
<b>HWD</b>	kg	0.00E+00	1.49E-05	1.56E-05	1.53E-05
<b>NHWD</b>	kg	1.63E-01	9.91E-01	9.51E-01	1.00E+00
<b>RWD</b>	kg	0.00E+00	2.74E-03	2.84E-03	2.81E-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



A nighttime photograph of a cityscape in the North Queensland region. The sky is a deep purple and blue, with some clouds. In the foreground, there is a parking lot with several cars. In the middle ground, there are several multi-story buildings, some with balconies and some with lit windows. A prominent building on the left has a blue vertical stripe. In the background, more buildings and a large, curved structure are visible. The overall scene is illuminated by city lights.

# North Queensland region

Environmental profiles and parameters

# Product table list

## North Queensland

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

### Lower carbon concrete products

#### Table No. 1 and 2 .....98

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

#### Table No. 3 and 4 .....99

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

#### Table No. 5 and 6 .....100

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

#### Table No. 7 and 8 .....101

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

### Normal class concrete products

#### Table No. 9 and 10 .....102

- 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

### Concrete for special applications

#### Table No. 11 and 12 .....103

- HIGH SLUMP 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- HIGH SLUMP 80 MPa

#### Table No. 13 and 14 .....104

- STABILISED SAND 14:1
- KERB MACHINE 280kg
- KERB MACHINE 320kg
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE
- TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE
- TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE

#### Table No. 15 and 16 .....105

- NO FINES 6:1
- POST TENSIONED 40 MPa 22@4
- SHOTCRETE 32 MPa

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

North Queensland

ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	
159	172	192	227	292	
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
165	179	199	236	304	
ENVIROCRETE® 30% 20 MPa	ENVIROCRETE® 30% 25 MPa	ENVIROCRETE® 30% 32 MPa	ENVIROCRETE® 30% 40 MPa	ENVIROCRETE® 30% 50 MPa	
211	230	258	308	399	
ENVIROCRETE® 40% 20 MPa	ENVIROCRETE® 40% 25 MPa	ENVIROCRETE® 40% 32 MPa	ENVIROCRETE® 40% 40 MPa	ENVIROCRETE® 40% 50 MPa	
169	184	205	243	313	
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	
257	287	312	398	500	
HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa		
315	348	362	547		
STABILISED SAND 14:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
71	243	360	332	358	421
NO FINES 6:1	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa			
233	316	343			

# North Queensland region

**TABLE 1. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, NORTH QUEENSLAND, PER M<sup>3</sup>**

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>159</b>	<b>172</b>	<b>192</b>	<b>227</b>	<b>292</b>
<b>ODP</b>	kg CFC11 eq	6.27E-06	6.58E-06	7.03E-06	7.88E-06	9.35E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.707	0.766	0.849	1.00	1.28
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.108	0.116	0.127	0.148	0.186
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0582	0.0616	0.0663	0.0752	0.0911
<b>ADPE</b>	kg Sb eq	3.23E-06	3.55E-06	3.95E-06	4.77E-06	7.37E-06
<b>ADPF</b>	MJ <sub>NCV</sub>	1460	1570	1730	2020	2550

**TABLE 2. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NORTH QUEENSLAND, PER M<sup>3</sup>**

Parameter	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	1.87E+01	2.04E+01	2.26E+01	2.70E+01	3.55E+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>	1.87E+01	2.04E+01	2.26E+01	2.70E+01	3.55E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.52E+03	1.63E+03	1.79E+03	2.09E+03	2.63E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	4.31E+00	4.78E+00	5.45E+00	6.69E+00	1.07E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	1.52E+03	1.64E+03	1.80E+03	2.10E+03	2.64E+03
<b>SM</b>	kg	1.40E+02	1.56E+02	1.78E+02	2.18E+02	2.90E+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>	3.22E+00	3.22E+00	3.23E+00	3.24E+00	3.24E+00
<b>HWD</b>	kg	6.23E-06	6.89E-06	7.56E-06	9.29E-06	1.49E-05
<b>NHWD</b>	kg	5.78E-01	6.38E-01	7.19E-01	8.72E-01	1.36E+00
<b>RWD</b>	kg	1.16E-03	1.28E-03	1.42E-03	1.74E-03	2.81E-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

## North Queensland region

**TABLE 3.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, NORTH QUEENSLAND, 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>165</b>	<b>179</b>	<b>199</b>	<b>236</b>	<b>304</b>
<b>ODP</b>	kg CFC11 eq	6.20E-06	6.50E-06	6.94E-06	7.76E-06	9.20E-06
<b>AP</b>	kg SO <sub>2</sub> eq	0.666	0.719	0.796	0.937	1.19
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.109	0.117	0.128	0.149	0.187
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0570	0.0602	0.0648	0.0734	0.0889
<b>ADPE</b>	kg Sb eq	6.24E-06	6.89E-06	7.81E-06	9.51E-06	1.52E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	1460	1560	1720	2010	2540

**TABLE 4.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NORTH QUEENSLAND, 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>	1.85E+01	2.01E+01	2.25E+01	2.67E+01	3.57E+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>	1.85E+01	2.01E+01	2.25E+01	2.67E+01	3.57E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	1.51E+03	1.62E+03	1.78E+03	2.07E+03	2.62E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	5.17E+00	5.74E+00	6.56E+00	8.03E+00	1.28E+01
<b>PENRT</b>	MJ <sub>NCV</sub>	1.52E+03	1.63E+03	1.79E+03	2.08E+03	2.63E+03
<b>SM</b>	kg	1.29E+02	1.44E+02	1.63E+02	2.01E+02	2.66E+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>	3.20E+00	3.20E+00	3.20E+00	3.21E+00	3.20E+00
<b>HWD</b>	kg	9.61E-06	1.07E-05	1.22E-05	1.49E-05	2.42E-05
<b>NHWD</b>	kg	1.39E+00	1.54E+00	1.74E+00	2.13E+00	3.46E+00
<b>RWD</b>	kg	1.92E-03	2.13E-03	2.43E-03	2.98E-03	4.84E-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 5.** ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, NORTH QUEENSLAND, 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
GWP	kg CO <sub>2</sub> eq	211	230	258	308	399
ODP	kg CFC11 eq	6.14E-06	6.43E-06	6.86E-06	7.67E-06	9.07E-06
AP	kg SO <sub>2</sub> eq	0.600	0.646	0.713	0.835	1.06
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.122	0.131	0.145	0.169	0.214
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0554	0.0584	0.0627	0.0708	0.0853
ADPE	kg Sb eq	3.23E-06	3.54E-06	3.95E-06	4.77E-06	7.36E-06
ADPF	MJ <sub>NCV</sub>	1560	1680	1850	2170	2750

**TABLE 8.** ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NORTH QUEENSLAND, 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
PERE	MJ <sub>NCV</sub>	1.73E+01	1.87E+01	2.08E+01	2.47E+01	3.24E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.73E+01	1.87E+01	2.08E+01	2.47E+01	3.24E+01
PENRE	MJ <sub>NCV</sub>	1.62E+03	1.74E+03	1.91E+03	2.24E+03	2.83E+03
PENRM	MJ <sub>NCV</sub>	4.31E+00	4.78E+00	5.45E+00	6.69E+00	1.07E+01
PENRT	MJ <sub>NCV</sub>	1.62E+03	1.74E+03	1.92E+03	2.25E+03	2.84E+03
SM	kg	5.82E+01	6.55E+01	7.38E+01	9.15E+01	1.21E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.22E+00	3.21E+00	3.22E+00	3.23E+00	3.23E+00
HWD	kg	6.23E-06	6.89E-06	7.56E-06	9.29E-06	1.49E-05
NHWD	kg	5.67E-01	6.25E-01	7.05E-01	8.55E-01	1.34E+00
RWD	kg	1.16E-03	1.28E-03	1.42E-03	1.74E-03	2.81E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 7. ENVIRONMENTAL PROFILES (A1-A3), LOWER CARBON CONCRETE, NORTH QUEENSLAND, 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
GWP	kg CO <sub>2</sub> eq	169	184	205	243	313
ODP	kg CFC11 eq	6.09E-06	6.39E-06	6.80E-06	7.60E-06	8.98E-06
AP	kg SO <sub>2</sub> eq	0.631	0.681	0.752	0.884	1.12
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.109	0.117	0.128	0.149	0.187
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0554	0.0584	0.0626	0.0707	0.0852
ADPE	kg Sb eq	3.18E-06	3.49E-06	3.89E-06	4.69E-06	7.26E-06
ADPF	MJ <sub>NCV</sub>	1430	1540	1690	1970	2480

**TABLE 8. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE, NORTH QUEENSLAND, 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
PERE	MJ <sub>NCV</sub>	1.67E+01	1.81E+01	2.00E+01	2.37E+01	3.12E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.67E+01	1.81E+01	2.00E+01	2.37E+01	3.12E+01
PENRE	MJ <sub>NCV</sub>	1.49E+03	1.59E+03	1.75E+03	2.03E+03	2.56E+03
PENRM	MJ <sub>NCV</sub>	4.31E+00	4.78E+00	5.45E+00	6.69E+00	1.07E+01
PENRT	MJ <sub>NCV</sub>	1.49E+03	1.60E+03	1.75E+03	2.04E+03	2.57E+03
SM	kg	1.16E+02	1.30E+02	1.48E+02	1.82E+02	2.41E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.19E+00	3.18E+00	3.19E+00	3.19E+00	3.17E+00
HWD	kg	6.23E-06	6.89E-06	7.56E-06	9.29E-06	1.49E-05
NHWD	kg	5.63E-01	6.20E-01	6.99E-01	8.48E-01	1.33E+00
RWD	kg	1.16E-03	1.28E-03	1.42E-03	1.74E-03	2.81E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 9.** ENVIRONMENTAL PROFILES (A1-A3), NORMAL CLASS CONCRETE, NORTH QUEENSLAND, 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
GWP	kg CO <sub>2</sub> eq	257	287	312	398	500
ODP	kg CFC11 eq	6.14E-06	6.51E-06	6.80E-06	7.92E-06	9.14E-06
AP	kg SO <sub>2</sub> eq	0.687	0.756	0.814	1.01	1.25
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.139	0.153	0.165	0.205	0.253
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0581	0.0622	0.0655	0.0777	0.0916
ADPE	kg Sb eq	3.34E-06	3.68E-06	4.08E-06	4.98E-06	7.60E-06
ADPF	MJ <sub>NCV</sub>	1800	1980	2130	2650	3270

**TABLE 10.** ENVIRONMENTAL PARAMETERS (A1-A3), NORMAL CLASS CONCRETE, NORTH QUEENSLAND, 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
PERE	MJ <sub>NCV</sub>	2.08E+01	2.31E+01	2.50E+01	3.14E+01	4.01E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	2.08E+01	2.31E+01	2.50E+01	3.14E+01	4.01E+01
PENRE	MJ <sub>NCV</sub>	1.85E+03	2.04E+03	2.19E+03	2.72E+03	3.35E+03
PENRM	MJ <sub>NCV</sub>	4.31E+00	4.78E+00	5.45E+00	6.69E+00	1.07E+01
PENRT	MJ <sub>NCV</sub>	1.86E+03	2.04E+03	2.20E+03	2.73E+03	3.36E+03
SM	kg	1.96E-03	2.22E-03	2.45E-03	3.20E-03	4.09E-03
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	3.27E+00	3.28E+00	3.28E+00	3.33E+00	3.34E+00
HWD	kg	6.23E-06	6.89E-06	7.56E-06	9.29E-06	1.49E-05
NHWD	kg	5.94E-01	6.58E-01	7.36E-01	9.05E-01	1.40E+00
RWD	kg	1.16E-03	1.28E-03	1.42E-03	1.74E-03	2.81E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00



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**TABLE 11.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NORTH QUEENSLAND, PER M<sup>3</sup>

Indicator	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
<b>GWP</b>	<b>kg CO<sub>2</sub> eq</b>	<b>315</b>	<b>348</b>	<b>362</b>	<b>547</b>
<b>ODP</b>	kg CFC11 eq	9.25E-06	9.89E-06	1.00E-05	1.14E-05
<b>AP</b>	kg SO <sub>2</sub> eq	1.14	1.23	1.18	1.45
<b>EP</b>	kg PO <sub>4</sub> <sup>3-</sup> eq	0.189	0.207	0.208	0.284
<b>POCP</b>	kg C <sub>2</sub> H <sub>4</sub> eq	0.0880	0.0942	0.0947	0.113
<b>ADPE</b>	kg Sb eq	1.05E-05	4.93E-06	2.06E-05	3.71E-05
<b>ADPF</b>	MJ <sub>NCV</sub>	2530	2760	2750	3740

**TABLE 12.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NORTH QUEENSLAND, PER M<sup>3</sup>

Parameter	Unit	HIGH SLUMP 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa	HIGH SLUMP 80 MPa
<b>PERE</b>	MJ <sub>NCV</sub>	3.30E+01	3.49E+01	3.56E+01	5.14E+01
<b>PERM</b>	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	2.48E-02	4.40E-02
<b>PERT</b>	MJ <sub>NCV</sub>	3.30E+01	3.49E+01	3.56E+01	5.14E+01
<b>PENRE</b>	MJ <sub>NCV</sub>	2.61E+03	2.84E+03	2.84E+03	3.84E+03
<b>PENRM</b>	MJ <sub>NCV</sub>	1.31E+01	1.47E+01	1.84E+00	3.26E+00
<b>PENRT</b>	MJ <sub>NCV</sub>	2.62E+03	2.86E+03	2.84E+03	3.84E+03
<b>SM</b>	kg	2.50E+02	2.70E+02	2.38E+02	1.27E+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>	3.18E+00	3.22E+00	3.20E+00	3.32E+00
<b>HWD</b>	kg	2.01E-05	1.86E-05	2.23E-05	4.05E-05
<b>NHWD</b>	kg	2.10E+00	3.41E-01	5.58E+00	1.01E+01
<b>RWD</b>	kg	3.86E-03	3.16E-03	4.50E-03	8.18E-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 13.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NORTH QUEENSLAND, PER M<sup>3</sup>

Indicator	Unit	STABILISED SAND 14:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
GWP	kg CO <sub>2</sub> eq	71	243	360	332	358	421
ODP	kg CFC11 eq	3.55E-06	7.04E-06	7.68E-06	8.49E-06	8.29E-06	9.29E-06
AP	kg SO <sub>2</sub> eq	0.541	0.687	0.929	0.919	0.953	1.10
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.051	0.139	0.188	0.183	0.193	0.225
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0282	0.0637	0.0747	0.0790	0.0774	0.0891
ADPE	kg Sb eq	5.03E-07	4.50E-06	5.57E-06	1.59E-05	5.62E-06	1.52E-05
ADPF	MJ <sub>NCV</sub>	640	1790	2440	2380	2470	2980

**TABLE 14.** ENVIRONMENTAL PARAMETERS (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NORTH QUEENSLAND, PER M<sup>3</sup>

Parameter	Unit	STABILISED SAND 14:1	KERB MACHINE 280kg	KERB MACHINE 320kg	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE TREMIE B2 EXPOSURE	TMR MRTS70 / 40 MPa 20mm PUMP B2 EXPOSURE	TMR MRTS70 / 50 MPa 20mm TREMIE B2 EXPOSURE
PERE	MJ <sub>NCV</sub>	5.24E+00	1.97E+01	2.90E+01	3.09E+01	2.85E+01	4.13E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	7.21E-02	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	5.24E+00	1.97E+01	2.90E+01	3.10E+01	2.85E+01	4.13E+01
PENRE	MJ <sub>NCV</sub>	6.68E+02	1.85E+03	2.51E+03	2.46E+03	2.54E+03	3.05E+03
PENRM	MJ <sub>NCV</sub>	0.00E+00	4.02E+00	6.12E+00	5.35E+00	7.94E+00	3.41E+01
PENRT	MJ <sub>NCV</sub>	6.68E+02	1.86E+03	2.52E+03	2.46E+03	2.55E+03	3.08E+03
SM	kg	1.04E+02	8.74E+01	2.85E-03	1.25E+02	1.08E+02	1.25E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	2.22E+00	3.13E+00	3.25E+00	3.22E+00	3.22E+00	3.23E+00
HWD	kg	0.00E+00	7.61E-06	9.71E-06	2.55E-05	1.10E-05	4.23E-05
NHWD	kg	6.73E-02	9.34E-01	1.11E+00	3.88E+00	1.01E+00	2.16E+00
RWD	kg	0.00E+00	1.46E-03	1.86E-03	3.86E-03	2.07E-03	7.72E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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**TABLE 15.** ENVIRONMENTAL PROFILES (A1-A3), CONCRETE FOR SPECIAL APPLICATIONS, NORTH QUEENSLAND, PER M<sup>3</sup>

Indicator	Unit	NO FINES 6:1	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
GWP	kg CO <sub>2</sub> eq	233	316	343
ODP	kg CFC11 eq	4.71E-06	7.65E-06	8.68E-06
AP	kg SO <sub>2</sub> eq	0.606	0.853	0.930
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	0.124	0.174	0.188
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	0.0452	0.0711	0.0803
ADPE	kg Sb eq	8.91E-07	5.69E-06	7.29E-06
ADPF	MJ <sub>NCV</sub>	1550	2230	2440

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

Parameter	Unit	NO FINES 6:1	POST TENSIONED 40 MPa 22@4	SHOTCRETE 32 MPa
PERE	MJ <sub>NCV</sub>	1.72E+01	2.62E+01	2.85E+01
PERM	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
PERT	MJ <sub>NCV</sub>	1.72E+01	2.62E+01	2.85E+01
PENRE	MJ <sub>NCV</sub>	1.59E+03	2.29E+03	2.51E+03
PENRM	MJ <sub>NCV</sub>	0.00E+00	1.02E+01	1.02E+01
PENRT	MJ <sub>NCV</sub>	1.59E+03	2.30E+03	2.52E+03
SM	kg	1.87E-03	9.36E+01	1.29E+02
RSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ <sub>NCV</sub>	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	2.49E+00	3.25E+00	3.07E+00
HWD	kg	0.00E+00	1.31E-05	1.47E-05
NHWD	kg	1.57E-01	8.98E-01	1.38E+00
RWD	kg	0.00E+00	2.41E-03	2.78E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00

# 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 percent 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:

- Maintaining **koala fodder plantations** at Narangba and Petrie quarries in Queensland.
- 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.
- 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.
- Conservation work to provide habitat for the threatened **legless lizard** and **spiny rice-flower** at Deer Park Quarry in Victoria.
- Construction of a **bird island habitat** as part of our rehabilitation of wetlands at our Dunmore Quarry in New South Wales.
- 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 percent 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. Boral's major industry associations 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)

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