



Environmental Product Declaration

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

Western Suburbs Concrete WGS4020-1 I Pre-mix concrete



Programme: The International EPD® System www.environdec.com

Programme operator: EPD International AB

Regional Programme: EPD Australasia www.epd-australasia.com

EPD Registration no. S-P-13809 | Version 1.0

Date of issue 2024-05-16 | Valid until 2029-05-16

Geographical scope: Australia

EPD of a single concrete product from one location

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



Contents

Programme information and verification	1
About us	2
Product description	3
Technical compliance	4
Declared unit	4
Scope of the EPD	5
Product stages	7
Life cycle assessment (LCA) methodology	9
Background data	9
Allocation	9
Cut-off criteria	9
Key assumptions	9
Life cycle assessment (LCA) indicators	10
Results: Environmental profiles	12
References	17
Contact information	18

Disclaimer

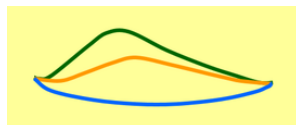
EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products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

Programme 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 as they enable transparency and comparability between EPDs. This EPD provides environmental indicators for selected concrete products, manufactured at Western Suburbs Concrete's North Penrith facility in New South Wales (NSW).

This EPD is a "cradle-to-gate plus modules C1-C4, D" declaration covering production and end-of-life life cycle stages. This EPD is verified to be compliant with EN 15804.

Western Suburbs Concrete (WSC) Pty Ltd, as the EPD owner, has the sole ownership, liability, and responsibility for the EPD.

Declaration Owner	Western Suburbs Concrete (WSC) Pty Ltd 1A Coombes Drive Penrith NSW 2750, Australia Web: www.wsc.com.au Phone: +61 02 4761 6161			
EPD Program Operator (Regional programme)	EPD International AB Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com	EPD Australasia Limited Address: 315a Hardy Street, Nelson 7010, New Zealand Web: www.epd-australasia.com Email: info@epd-australasia.com Phone: +61 2 8005 8206 (AU)	 EPD® ENVIRONMENTAL PRODUCT DECLARATION	
EPD Produced by:	start2see Pty Ltd 36 Renaissance Bvd, Mernda, VIC 3754, Australia Web: www.start2see.com.au Email: Rob.Rouwette@start2see.com.au Phone: +61 403 834 470			 START2SEE LIFE CYCLE ASSESSMENTS
EPD registration number:	S-P-13809	Version:	1.0	
Published:	2024-05-16	Valid until:	2029-05-16 (5 years)	
Reference year for data:	2022-01-01 – 2022-12-31			
CEN standard EN 15804 served as the core PCR				
PCR:	PCR 2019:14 Construction Products, Version 1.3.3, 2024-03-01 (valid until 2024-12-20) C-PCR-003 (to 2019:14) Concrete and concrete elements, version 2023-01-02			
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: No chair appointed. Contact via info@environdec.com			
Independent verification of the declaration and data, according to ISO 14025:	☐ EPD process certification (Internal) ☒ EPD verification (External)			
Third party verifier: Accredited or approved by EPD Australasia	Angela Schindler, Umweltberatung Web: www.schindler-umwelt.de Email: angela@schindler-umwelt.de Phone: +49 07553 919 9456			

About us

“Western Suburbs Concrete (WSC) has been operating since 1987, supplying premixed concrete from Western Sydney”



WSC manufactures a wide range of concrete products, operating out of a large purpose-built premise in North Penrith, with our own transport fleet.

This EPD covers a single concrete mix, manufactured at our North Penrith site.

Product description

WSC specialises in manufacturing pre-mix concrete, ranging in strength grade as per client and application requirements. Our pre-mix concrete consists of a mixture of cementitious binder, supplementary cementitious materials (fly ash, slag), coarse aggregates, natural sand, water and admixtures.

Applications include beams, bedding screed, driveways, infrastructure, footings and foundations.

The product included in this EPD and its strength grade is shown below. The product composition is presented in Table 1. For reasons of confidentiality, a range is provided.

Product	Strength grade
WGS4020-1	40 MPa

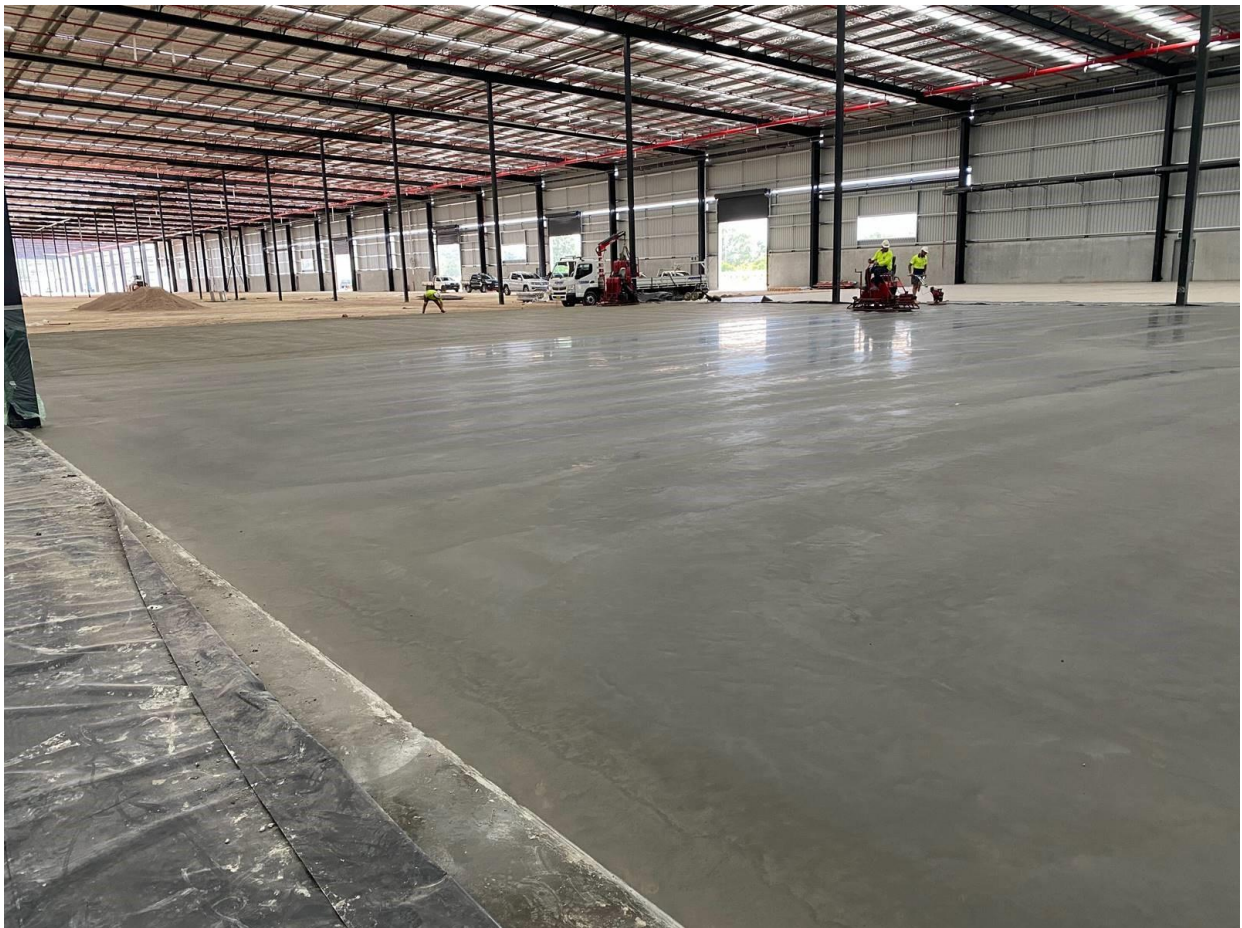


Table 1: Product content

Ingredient	Proportion (% m/m)	Post-consumer material, weight (%)	Renewable material, weight (%)
General Purpose Cement [□]	7-17%	0%	0%
Coarse aggregates [†]	37-47%	0%	0%
Natural sand [†]	23-41%	0%	0%
Water	8-9%	0%	0%
Fly Ash [‡]	1-5%	0%	0%
Slag (GGBFS) [‡]	0-4%	0%	0%
Admixtures	<0.5%	0%	0%
Total	2277 kg/m³	0%	0%

[□] Cement in concrete contains traces of Chromium VI (hexavalent).

[†] Crystalline-silica (quartz) may be a constituent of sand, crushed stone, gravel, blast furnace slag and fly ash used in any particular concrete mix.

[‡] Cementitious additives may contain traces of metals.

In this LCA, both fly ash and slag are considered secondary materials.

The product, as supplied, is 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). Dust from this product is classified as Hazardous according to the Approved Criteria for Classifying Hazardous Substances 3rd Edition (NOHSC 2004). Concrete products are classified as non-dangerous goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. When concrete products are cut, sawn, abraded or crushed, dust is created which contains crystalline silica, some of which may be respirable (particles small enough to go into the deep parts of the lung when breathed in), and which is hazardous. Exposure through inhalation should be avoided.

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).

* Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals.

Technical Compliance

WSC concrete products comply with relevant technical specifications as per AS 1379:2007 Specification and supply of concrete.

Declared unit

“1 cubic metre (m³) of ready-mixed concrete, as ordered by our clients”

Scope of the Environmental Product Declaration

This EPD covers life cycle stages A1-3, C1-4 and D. This EPD covers the processes that occur in as many of the product's life cycle stages as could be effectively modelled. Stages A4, A5 and B1-7 have not been included as these are better defined at building or structure level.

Table 2: Scope of EPD

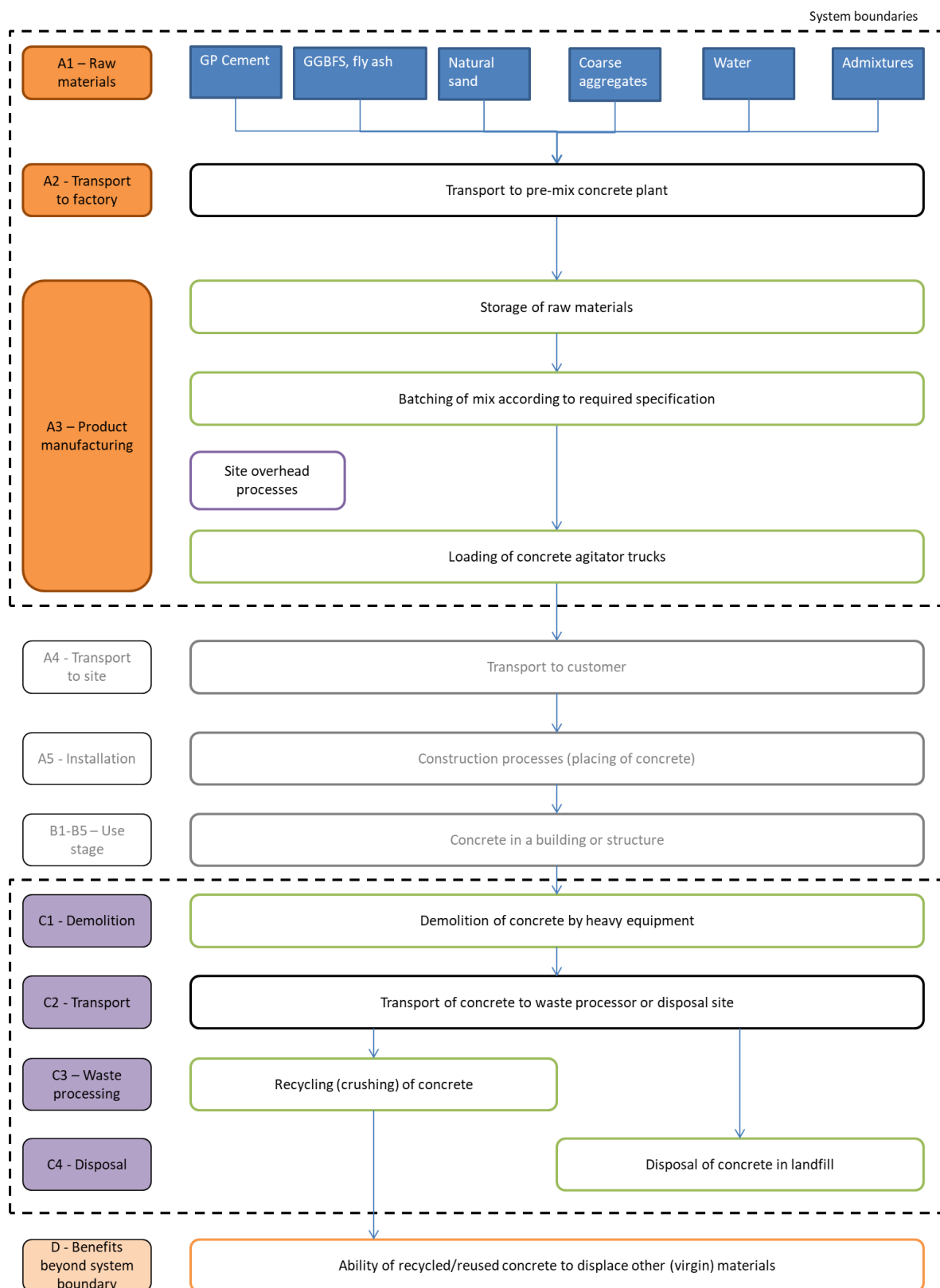
Stages	Product Stage			Construction Stage		Use Stage							End-of-life Stage				Benefits beyond system boundary
	Raw Materials	Transport	Production	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/Demolition	Transport	Waste Processing	Disposal	Reuse, recovery, recycling potential
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Scenario			Scenario		Scenario							Scenario				Scenario
Modules Declared	✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	ND	✓	✓	✓	✓	✓
Geography	AU	AU	AU										AU	AU	AU	AU	AU
Share of specific data	>95%																
Variation products	0%																
Variation sites	0%																

✓ = module is included in this study

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

We have used specific data from our cement suppliers, thereby bringing the percentage of specific data to above 95%.

Figure 1 – Flow diagram of main pre-mix concrete production processes, life cycle stages and visualization of system boundaries



Product Stage (A1-A3)

Raw Materials – Module A1

Extraction and processing of raw materials results in environmental impacts from the use of energy and resources, as well as from process emissions and waste. Cement is produced from limestone and gypsum, aggregates and natural sand are extracted from quarries, fly ash and ground granulated blast furnace slag (GGBFS) are rest products from electricity generation and steel production, admixtures are specialised chemical formulations that are typically produced by blending selected ingredients.

Transportation – Module A2

Raw materials are typically transported from suppliers to our site via (articulated) trucks. Transport of raw materials have been included in the LCA based upon actual transport modes and distances relevant to our site in Penrith.

Manufacturing – Module A3

Pre-mix concrete products are manufactured by mixing the raw materials in selected quantities for each mix design.



The "**Construction process stage**" and "**Use stage**" have been excluded from the life cycle assessment, as the pre-mix concrete can be used for a range of different applications for which the use scenarios are unknown. The impacts of these stages are best determined at project level.

End of life stage (C1-C4)

The end-of-life modules for pre-mix concrete are based on generic scenarios. The scenarios included are currently in use and are representative for one of the most probable alternatives.

Module C1 covers demolition of the concrete at the end of its service life. For concrete produced in Penrith, we have used the end-of-life scenario representative for NSW building & demolition materials products based on the National Waste Report 2022 (NWR 2022). This scenario implies that 79.6% of the concrete is recycled and the remaining 20.4% of the concrete is sent to landfill.

Module C2 comprises the transport from the demolition site to a recycling centre or landfill site (50km). Module C3 encompasses the recycling process (i.e. crushing of concrete), while Module C4 represents disposal of concrete in a landfill site.

The concrete reaches end-of-waste status when it is crushed and stockpiled as “recycled crushed concrete” (RCC) aggregates.

We have modelled a single scenario for concrete with a density of 2,300 kg/m³. This is a conservative value for the concrete mixes covered by the EPD. The impact of this simplification is much smaller than the impact of the scenario and data assumptions applied to the end-of-life modules.

Due to high uncertainty in the parameters and lack of data, CO₂-uptake (carbonation) has not been included at end-of-life.

Resource recovery stage (D)

Module D includes any benefits and loads from net flows leaving the product system (that have passed the end-of-waste state). For this EPD, any material collected for recycling and processed in Module C3, is considered to go through to Module D. We have assumed that Recycled Crushed Concrete aggregates (the output of module C3) replace virgin aggregates (crushed rocks) in module D.

Per cubic metre of concrete, module D credits the avoided impacts for 1.83 tonnes of crushed aggregates. The net flow calculation is not affected by SCMs.

Table 3: End-of-life scenario parameters

Processes	Quantity per m ³ of concrete	Unit
Collection process specified by type	2,300	kg collected separately
	0	kg collected with mixed construction waste
Transport from demolition site to recovery / disposal sites	50	km transport
Recovery system specified by type	0	kg for re-use
	1,832	kg for recycling
	0	kg for energy recovery
Disposal to landfill	468	kg product or material for final deposition
Assumptions for scenario development		145 MJ of diesel for the demolition process (C1) 87.4 MJ of diesel for the crushing process (C3) + 9.2 MJ of electricity for the crushing process (C3)

Life Cycle Assessment (LCA) Methodology

Background Data

Primary data covers the 2022 calendar year and has been sourced from Western Suburbs Concrete. Background data is predominantly sourced from EPDs, AusLCI and the AusLCI shadow database. Data for cement has been sourced from our supplier's EPD (registration number S-P-07449) (Cement Australia 2023). Data for admixtures has been sourced from EPDs published by EFCA (EFCA 2021a, 2021b, 2023). As a result, the vast majority of the environmental profile of our products is based on life cycle data less than three years old. Background data used is less than 10 years old.

Methodological choices have been applied in line with EN 15804:2012+A2:2019; deviations have been recorded.

Allocation

The key processes that require allocation are:

- Production of concrete mixes: All shared processes are attributed to concrete products based on their volume.
- Fly ash: all environmental impacts of the power plant have been allocated to the main product: electricity. Fly ash has only received the burdens of the transport to our site.
- Blast Furnace Slag (BFS): BFS is a by-product from steelmaking. We have used the AusLCI data for BFS ('Blast Furnace Slag allocation, at steel plant / AU U'), which contain impacts from pig iron production allocated to blast furnace slag using economic allocation. One tonne of slag equals the environmental impact of 0.0127 tonnes of pig iron. Drying of slag (using 769 MJ of natural gas per tonne) and milling of slag (using 50 kWh/t electricity) is included.

Allocation approaches may have a material effect on concrete products containing fly ash and/or ground granulated blast furnace slag.

Cut-off criteria

- The cut-off criteria applied are 1% of renewable and non-renewable primary energy usage, 1% of the total mass input of a process and 1% of environmental impacts.
- The contribution of capital goods (production equipment and infrastructure) and personnel is excluded, as these processes are non-attributable and they contribute less than 10% to GWP-GHG.

Key assumptions

- The concrete composition of each product is provided by WSC and has been accepted as is.
- Cement data are taken from a supplier specific EPD covering the EN 15804+A2 indicators (based on gross emissions). We modelled cement's EN 15804+A1 results using AusLCI data, with GWP adjusted to match the supplier EPD result.
- The GCCA-tool that underpins the cement data does not deliver sufficient information for the indicators HWD, NHWD and RWD as defined in EN 15804+A2, but only refer to the foreground system. This results in underreporting of these indicators.
- Admixture data are taken from generic EPDs. Additional environmental impact indicators are not declared in the admixture EPDs, which results in underreporting of these indicators.
- Electricity has been modelled for core processes using adjusted AusLCI data to represent the estimated residual electricity grid mix in Australia. This is done by removing renewables from the Australian Energy Statistics 2023 data (Table O1.1). The GWP-GHG of the electricity is 0.91 kg CO₂e / kWh (aligned with NGA 2023). The proxy residual grid mix is made up of black coal (53.9%), brown coal (17.3%), natural gas (26.3%), and oil products (2.5%). Given the low contribution of electricity consumption to the GWP emissions, the selection of the electricity grid mix does not have a material impact on the results.
- The end-of-life scenario is based on landfill and recycling rates for building and demolition materials in New South Wales, as per the National Waste Report 2022 (NWR 2022), table 37.

Life Cycle Assessment (LCA) indicators

An LCA serves as the foundation for this EPD. An LCA analyses the production systems of a product. It provides comprehensive evaluations of all upstream and downstream energy inputs and outputs. The results are provided in a form which covers a range of environmental impact categories.

Table 4: Environmental indicators legend (EN 15804+A2)

Core indicators	Acronym	Unit
Climate change – total	GWP-total	kg CO ₂ equivalent
Climate change – fossil	GWP-fossil	kg CO ₂ equivalent
Climate change – biogenic	GWP-biogenic	kg CO ₂ equivalent
Climate change – land use and land use change	GWP-luluc	kg CO ₂ equivalent
Ozone layer depletion	ODP	kg CFC-11 equivalent
Acidification	AP	mol H ⁺ equivalent
Eutrophication aquatic freshwater	EP-freshwater	kg P equivalent
Eutrophication aquatic marine	EP-marine	kg N equivalent
Eutrophication terrestrial	EP-terrestrial	mol N equivalent
Photochemical ozone formation	POCP	kg NMVOC equivalent
Abiotic depletion potential - elements ²	ADP minerals & metals	kg Sb equivalent
Abiotic depletion potential – fossil fuels ²	ADP fossil	MJ, net calorific value
Water use ²	WDP	m ³ world equivalent deprived
Additional indicators	Acronym	Unit
Global Warming Potential – Greenhouse gases	GWP-GHG	kg CO ₂ eq
Particulate matter emissions	PM	disease incidence
Ionising radiation, human health ¹	IRP	kBq U235 equivalent
Ecotoxicity (freshwater) ²	ETP-fw	CTUe
Human toxicity, cancer effects ²	HTP-c	CTUh
Human toxicity, non-cancer effects ²	HTP-nc	CTUh
Land use related impacts / soil quality ²	SQP	- (dimensionless)
Additional GHG indicator	Acronym	Unit
Carbon footprint in line with IPCC AR5	GWP-GHG (IPCC AR5)	kg CO₂ eq

¹ This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials, is also not measured by this indicator.

² The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.



Note regarding various GWP indicators:

GWP-total is calculated using the European Union's Joint Research Centre's characterisation factors (CFs) based on the "EF 3.1 package" for CFs to be used in the EU's Product Environmental Footprint (PEF) framework. CFs listed by JRC include indirect radiative forcing, which results in higher numerical Global Warming Potential (GWP) values than the CFs in the internationally accepted (IPCC 2013).

The GWP-GHG indicator is identical to GWP-total except that the CFs for biogenic CO₂ are set to zero. The GWP-GHG indicator in PCR 2019:14 v1.3.3 differs from the GWP-GHG in PCR 2019:14 version 1.2.5 and earlier.

The "GWP-GHG (IPCC AR 5)" indicator is determined using the IPCC AR5 Global Warming Potentials (GWP) with a 100-year time horizon. This indicator is aligned with Australia's greenhouse gas reporting frameworks.

Table 5: Legend for parameters describing resource use, waste and output flows

Parameter	Acronym	Unit
Parameters describing resource use		
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ _{NCV}
Use of renewable primary energy resources used as raw materials	PERM	MJ _{NCV}
Total use of renewable primary energy resources	PERT	MJ _{NCV}
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ _{NCV}
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ _{NCV}
Total use of non-renewable primary energy resources	PENRT	MJ _{NCV}
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ _{NCV}
Use of non-renewable secondary fuels	NRSF	MJ _{NCV}
Use of net fresh water	FW	m ³
Waste categories		
Hazardous waste disposed	HWD	kg
Non-Hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Output flows		
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy	EE	MJ

Table 6: Legend for EN 15804+A1 indicators

Indicator	Acronym	Unit
Global warming potential	GWP	kg CO ₂ equivalent
Ozone layer depletion potential	ODP	kg CFC-11 equivalent
Acidification potential	AP	kg SO ₂ equivalent
Eutrophication potential	EP	kg PO ₄ ³⁻ equivalent
Photochemical oxidation (Photochemical ozone creation) potential	POCP	kg ethylene equivalent
Abiotic depletion potential - elements	ADPE	kg Sb equivalent
Abiotic depletion potential – fossil fuels	ADPF	MJ _{NCV}

Results: Environmental profiles

The following section presents the results for each Life Cycle Assessment module. The results have been calculated with SimaPro software v9.5.0.0. To separate the use of primary energy into energy used as raw material and energy used as energy carrier, Option B from Annex 3 of PCR 2019:14 has been applied.

Please consider the following mandatory statements when interpreting the results:

"The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks."

"The use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C is discouraged."



WGS4020-1

The environmental indicators are expressed per m³ of concrete.

Table 7: Environmental indicators EN 15804+A2, WGS4020-1 pre-mix concrete, per m³

Environmental Indicator	Unit	Module A1-A3	Module C1	Module C2	Module C3	Module C4	Module D
Core Indicators							
GWP-total	kg CO ₂ -eq.	2.74E+02	1.22E+01	1.47E+01	7.52E+00	1.11E+00	-1.61E+01
GWP-fossil	kg CO ₂ -eq.	2.74E+02	1.22E+01	1.47E+01	7.51E+00	1.11E+00	-1.61E+01
GWP-biogenic	kg CO ₂ -eq.	1.14E-01	8.08E-04	9.10E-04	7.16E-03	8.98E-05	-3.17E-02
GWP-luluc	kg CO ₂ -eq.	2.82E-02	5.83E-06	6.95E-06	3.48E-06	5.40E-07	-2.48E-06
ODP	kg CFC11-eq.	8.08E-06	1.95E-06	2.32E-06	9.49E-07	1.82E-07	-5.50E-07
AP	mol H ⁺ eq.	1.47E+00	1.34E-01	1.29E-01	2.07E-02	2.66E-03	-5.89E-02
EP-freshwater	kg P eq.	5.41E-02	1.62E-06	8.85E-07	5.57E-06	1.52E-07	-1.16E-05
EP-marine	kg N eq.	5.02E-02	5.83E-02	4.07E-02	3.68E-03	4.79E-04	-9.86E-03
EP-terrestrial	mol N eq.	2.83E+00	6.39E-01	4.46E-01	4.01E-02	5.24E-03	-1.07E-01
POCP	kg NMVOC eq.	7.09E-01	1.71E-01	1.09E-01	1.07E-02	1.41E-03	-2.80E-02
ADP minerals & metals²	kg Sb eq.	5.64E-05	1.44E-08	1.71E-08	1.86E-06	1.31E-09	-2.37E-06
ADP fossil²	MJ (NCV)	2.05E+03	1.70E+02	2.02E+02	1.07E+02	1.58E+01	-2.31E+02
WDP	m ³ world eq. deprived	1.57E+02	1.09E+00	1.29E+00	2.18E+00	1.02E-01	-1.09E+02
Additional indicators							
GWP-GHG	kg CO ₂ -eq.	2.74E+02	1.22E+01	1.47E+01	7.52E+00	1.11E+00	-1.61E+01
PM	Disease incidence	9.44E-06	3.55E-06	7.28E-07	1.38E-07	1.41E-08	-4.93E-07
IRP¹	kBq U235 eq.	2.55E+03	2.48E-04	2.95E-04	1.51E-03	2.30E-05	-1.47E-03
ETP-fw²	CTUe	1.05E+02	3.76E+01	4.47E+01	1.85E+01	3.45E+00	-1.11E+01
HTP-c²	CTUh	5.69E-07	4.71E-10	6.31E-11	1.57E-10	8.79E-12	-7.01E-10
HTP-nc²	CTUh	1.52E-05	2.51E-09	1.20E-09	1.03E-09	1.06E-10	-4.43E-09
SQP²	-	8.22E+02	8.16E-01	9.08E-01	2.04E+04	2.62E+01	-3.31E+02
Carbon footprint							
GWP-GHG (IPCC AR5)	kg CO₂ eq	274	12.2	14.7	7.52	1.11	-16.2

Footnotes:

¹ This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials, is also not measured by this indicator.

² The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Table 8: EN 15804+A2 parameters, WGS4020-1 pre-mix concrete, per m³

Parameter	Unit	Module A1-A3	Module C1	Module C2	Module C3	Module C4	Module D
PERE	MJ _{NCV}	6.44E+01	2.63E-01	2.90E-01	1.85E+00	3.10E-02	-1.32E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	6.44E+01	2.63E-01	2.90E-01	1.85E+00	3.10E-02	-1.32E+01
PENRE	MJ _{NCV}	2.11E+03	1.70E+02	2.02E+02	1.07E+02	1.58E+01	-2.31E+02
PENRM	MJ _{NCV}	5.56E+00	0.00E+00	0.00E+00	-9.45E+00	-2.42E+00	0.00E+00
PENRT	MJ _{NCV}	2.12E+03	1.70E+02	2.02E+02	9.78E+01	1.34E+01	-2.31E+02
SM	kg	1.43E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ _{NCV}	2.92E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	3.93E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.44E+00	2.46E-02	2.93E-02	3.82E-02	2.29E-03	-2.53E+00
HWD	kg	1.56E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.32E-01	7.79E-04	8.58E-04	5.24E-03	4.69E+02	-3.88E-02
RWD	kg	8.03E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	7.96E+01	0.00E+00	0.00E+00	1.83E+03	0.00E+00	0.00E+00
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

Table 9: EN 15804+A1 indicators, WGS4020-1 pre-mix concrete, per m³

Environmental Indicator	Unit	Module A1-A3	Module C1	Module C2	Module C3	Module C4	Module D
GWP	kg CO ₂ eq	2.73E+02	1.22E+01	1.47E+01	7.50E+00	1.11E+00	-1.61E+01
ODP	kg CFC11 eq	5.93E-06	1.54E-06	1.83E-06	7.50E-07	1.44E-07	-4.35E-07
AP	kg SO ₂ eq	1.15E+00	9.52E-02	7.17E-02	1.31E-02	2.14E-03	-1.85E-02
EP	kg PO ₄ ³⁻ eq	1.53E-01	1.96E-02	1.37E-02	1.28E-03	1.65E-04	-3.43E-03
POCP	kg C ₂ H ₄ eq	3.68E-02	9.33E-03	4.63E-03	7.29E-04	1.06E-04	-1.28E-03
ADPE	kg Sb eq	2.61E-05	1.46E-08	1.73E-08	1.87E-06	1.33E-09	-2.38E-06
ADPF	MJ _{NCV}	2.15E+03	1.70E+02	2.02E+02	1.07E+02	1.58E+01	-2.31E+02

References

AS 1379	Specification and supply of concrete, prepared by Committee BD-049 Manufacture of Concrete, published on 20 September 2007 by Standards Australia, Sydney
AusLCI 2023	Australian Life Cycle Inventory database v1.42 published by the Australian Life Cycle Assessment Society, 2023
ECHA 2023	European Chemicals Association, Candidate List of substances of very high concern for Authorisation, published in accordance with Article 59(10) of the REACH Regulation, Helsinki Accessed on 1 June 2023 from: https://echa.europa.eu/candidate-list-table
EFCA 2021a	EPD of Retarders, IBU EPD Declaration number EPD-EFC-20210195-IBG1-EN, issued 2021-12-16, based on EN 15804 and PCR for concrete admixtures; EPD owner: EFCA - European Federation of Concrete Admixtures Associations
EFCA 2021b	EPD of Hardening Accelerators, IBU EPD Declaration number EPD-EFC-20210196-IBG1-EN, issued 2021-12-16, based on EN 15804 and PCR for concrete admixtures; EPD owner: EFCA - European Federation of Concrete Admixtures Associations
EFCA 2023	EPD of Plasticizer and superplasticizer, IBU EPD Declaration number EPD-EFC-20210198-IBG2-EN, issued 2023-08-14, based on EN 15804 and PCR for concrete admixtures; EPD owner: EFCA - European Federation of Concrete Admixtures Associations
Environdec 2021	International EPD System, General Programme Instructions for the International EPD System, Version 4.0, 29 March 2021
Environdec 2023	c-PCR-003 Concrete and concrete elements (EN 16757:2022), Product category rules for concrete and concrete elements, version 2 January 2023
EN 15804+A2	EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products, European Committee for Standardization (CEN), Brussels, August 2021
EN 15804+A1	Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products, European Committee for Standardization (CEN), Brussels, November 2013
IPCC 2013	Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestad, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA
ISO 14025	Environmental labels and declarations - Type III environmental declarations - Principles and procedures. International Organization for Standardization, Geneva, Switzerland, 2006
ISO 14040	Environmental management - Life cycle assessment - Principles and framework. International Organization for Standardization, Geneva, Switzerland, 2006
ISO 14044	Environmental management - Life cycle assessment - Requirements and guidelines. International Organization for Standardization, Geneva, Switzerland, 2006
NGA 2023	Australian National Greenhouse Accounts Factors, Australian Government Department of Climate Change, Energy, the Environment and Water, August 2023
NWR 2022	Blue Environment, National Waste Report 2022, prepared for The Department of Climate Change, Energy, the Environment and Water, Final version 1.2, 16 December 2022 (updated 10 February 2023)
PCR 2019:14	Product category rules for Construction products (EN 15804+A2), registration number 2019:14, version 1.3.3, published on 1 March 2024.



Contact information

02 4761 6161

www.wsc.com.au

accounts@wsc.com.au

This publication provides general information only and is no substitute for professional engineering advice. No representations or warranties are made regarding the accuracy, completeness or relevance of the information provided. Users must make their own determination as to the suitability of this information or any WSC product for their specific circumstances. WSC accepts no liability for any loss or damage resulting from any reliance on the information provided in this publication.

©2024 Western Suburbs Concrete (WSC) (Australia) Pty Ltd ABN 40426304484. All rights reserved.

