ENVIRONMENTAL PRODUCT DECLARATION

READY MIX CONCRETE PRODUCTS

PROGRAMME:	The International EPD® System www.environdec.com
PROGRAMME OPERATOR:	EPD Australasia www.epd-australasia.com
EPD REGISTRATION NUMBER:	S-P-09353
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GEOGRAPHICAL SCOPE:	Australia

In accordance with ISO 14025 and EN15804:2012 +A2:2019

AUSTRALASIA EPD®

ECO PLATFORM EPD VERIFIED

HALLETT GROUP

WHAT IS AN ENVIRONMENTAL PRODUCT DECLARATION?

An Environmental Product Declaration (EPD) tells the environmental story of a product over its life cycle in a format that is clear and transparent. It is science-based, independently verified and publicly available. EPDs are often compared to the nutrition labels on food products.

EPDs help manufacturers translate complex sustainability information about their product's environmental footprint into simpler information that governments, companies, industry associations and end consumers can trust to make decisions.

An EPD communicates the environmental impacts at different stages in a product's life cycle. This includes for example greenhouse gas emissions plus a range of other environmental indicators, with results reported separately for each life cycle stage (product stage, construction stage, use stage and end-of-life-stage).

This EPD covers the environmental impacts of Ready Mix concrete products when used in infrastructure, commercial buildings, and residential buildings. The products are manufactured at five batching plants around South Australia.

This EPD is based on a "cradle-to-gate with modules C1–C4 and module D" Life Cycle Assessment (LCA), which includes production of the products as well as end-of-life. 'Cradle' refers to the raw material extraction and 'the gate' is the gate of the batching plants as the product is ready to go out to customers.

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HALLETT GROUP

ABOUT HALLETT GROUP

Hallett Group is the largest integrated building supplier, construction and mining materials company in South Australia. Our size and diversity give us an advantage in having a broad range of expertise to provide a balanced outcome for any project. We are well invested with the flexibility and agility to respond quickly and efficiently to any challenge or opportunity.

We are a proud South Australian owned and operated Company that continues to invest in our future through fixed plant upgrades, new transport fleet, increasing mobile plant capability and improved technology. Our consistently strong order books across our diversified businesses and our equally diverse client base is a testament to the quality of our work and our commitment to being the very best at what we do.

Most importantly, we are investing in people as our most important asset and our true competitive advantage. We recruit the most talented, collaborative and innovative people in the state and foster a continuous learning culture to ensure we remain at the top of our game. The diversity of our business means there are wide ranging opportunities for people to develop, learn and grow their careers.

Our customer projects are supported by our extensive network of resources and technical expertise. Through this, we can reduce client project risks through co-ordinated design and consultation, project delivery, supply chain management and logistics capability.

HALLET GROUP PRODUCT APPLICATIONS

INFRASTRUCTURE - From bridges and highways to communications and utilities, we provide the infrastructure that keeps you connected and protected.

COMMERCIAL - From high rise to shopfronts and stadiums, we provide interior and exterior solutions to create the beautiful, functional buildings where you work, shop and play.

RESIDENTIAL - From paving for your driveway to timber for your patio and all-glass shower enclosures for your bathroom, we provide the function you need with the aesthetics you want.

Hallett's corporate vision is 'be the dominant construction materials, mining materials and building products partner in South Australia and grow our business in attractive markets and industries'. This has resulted in our positive market reputation that is based on our values and business philosophy of:

Customer Focused

We are a partner that goes above and beyond to delight our customers and add real value, well beyond just our product offerings.

Agile, Innovative, and Fastest

We will be at the forefront of technology and innovation; we will be the fastest and most adaptive to identify, realise and seize opportunity.

Respect and Integrity

We will behave with professionalism and considered regard toward our internal and external stakeholders, fostering a diverse environment promoting candid constructive communication and ideas.

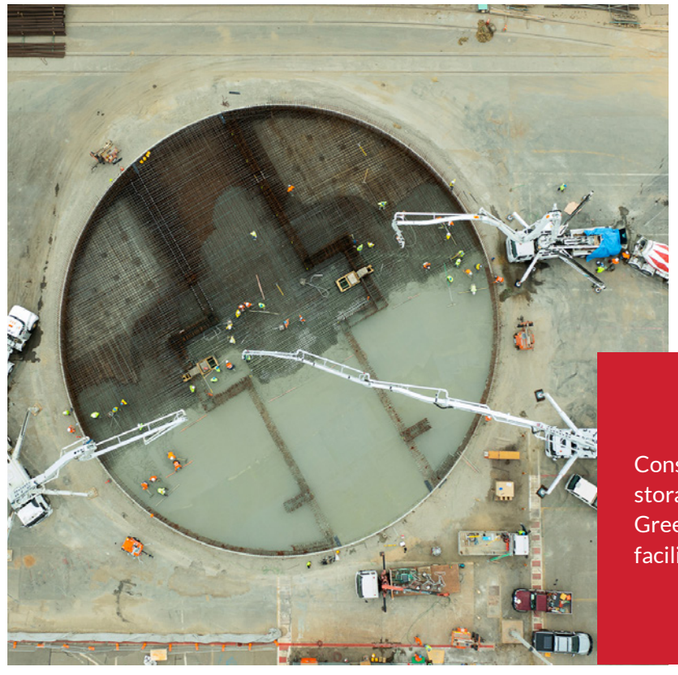
Business Excellence

We have a continual improvement mindset, we constantly evaluate ourselves and our business looking for ways to improve our safety, our sustainability, our service, our processes and most importantly our people.

OUR STEPS TOWARDS SUSTAINABILITY

At Hallett Group, we believe environmentally responsible, safe operations benefit our communities and drive positive results for the long term. As an industry leader, Hallett Group's aim has always been to meet - and strive to exceed - all federal, state and local environmental regulations.

However, environmental sustainability means looking beyond what is required of a company by governments and regulators. We continue to make significant progress on reducing our carbon footprint, increasing our energy efficiency, increasing recycled water use, reducing waste and managing our land with biodiversity in mind. It's the right thing to do for society, for our business and our stakeholders.



Construction of cement storage silo as part of the Green Cement Distribution facility at Port Adelaide.

REDUCING OUR ENVIRONMENTAL FOOTPRINT

The Hallett Group is committed to achieving its net zero emissions goal for all operations by 2050.

Hallett Group has developed a Net Zero Roadmap (with both short and long term targets) under the guidance from the GCCA 2050 Cement and Concrete Industry and the VDZ independent report 'Decarbonisation Pathways for the Australian Cement and Concrete Sector.'

READY MIX CONCRETE PRODUCTS

This EPD covers our ready-mixed concrete products. We supply a wide range of premixed concrete for a variety of applications.

We provide 20 and 25 MPa concrete for use primarily in residential slabs, footings, driveways and paths and 32 and 40 MPa or higher strength concrete which is primarily used for industrial jobs where a greater resistance to loading and trafficking is required.

At Hallett we strive to provide customers a range of different concrete mixes that can meet their technical and environmental needs. **Hallett Group's Enviro Construct** range offers low carbon mix designs to cater for many varied concrete applications.

Enviro Construct:

- Level 1 – Typical reduction of CO_2 embedded 26 – 28 %
- Level 2 – Typical reduction of CO_2 embedded 35 – 37 %
- Level 3 – Typical reduction of CO_2 embedded 44 – 47 %

Hallett also has access to **Carbon Cure** at particular plants which introduces CO_2 into the concrete mixes permanently embedding CO_2 into the concrete. However, no concrete products presented in this EPD use this technology.

Table 1. Concrete mix names, grades and Enviro Construct

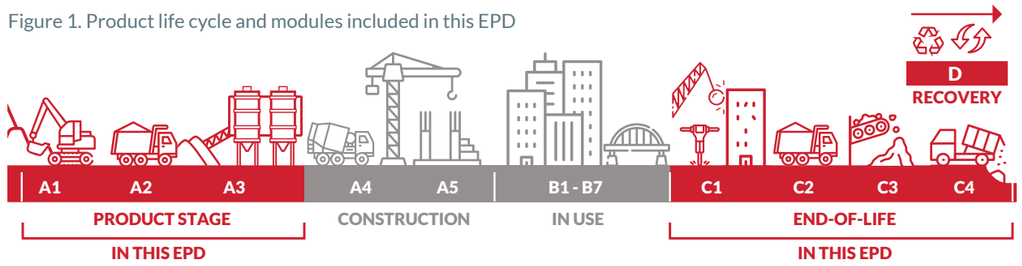
Mix name		Enviro Construct
N2020P Grade: 20 MPa	Reference mix	-
	F30	Level 1
	S30	Level 1
	S50	Level 2
N2520P Grade: 25 MPa	Reference mix	-
	F30	Level 1
	S30	Level 1
	T50	Level 3
	S50	Level 2
N3220P Grade: 32 MPa	Reference mix	-
	F30	Level 1
	S30	Level 1
	T50	Level 3
	S50	Level 3
N4020P Grade: 40 MPa	Reference mix	-
	F30	Level 1
	S30	Level 1
	T50	Level 3
	S50	Level 3
N5020P Grade: 50 MPa	Reference mix	-
	F30	Level 1
	S30	Level 1
	T50	Level 3
	S50	Level 3

PRODUCT LIFE CYCLE

This is a "cradle-to-gate with modules C1–C4 and module D" type EPD. This means that the production (modules A1-A3), end-of-life (C1-C4) and recovery (D) stages are modelled in this EPD. The distribution and construction process (modules A4-A5) and use stages (B1-B7) are not modelled as these are best considered at building or structure level.

The product stage involves the extraction (cradle) of all raw materials, transport to the batching plant, and the manufacturing/mixing of these materials to make ready-mix concrete ready to be distributed to customers (gate). The end-of-life stage includes the deconstruction of the concrete structure, the transportation to waste management facilities, and the recycling and landfilling of the concrete.

Figure 1. Product life cycle and modules included in this EPD



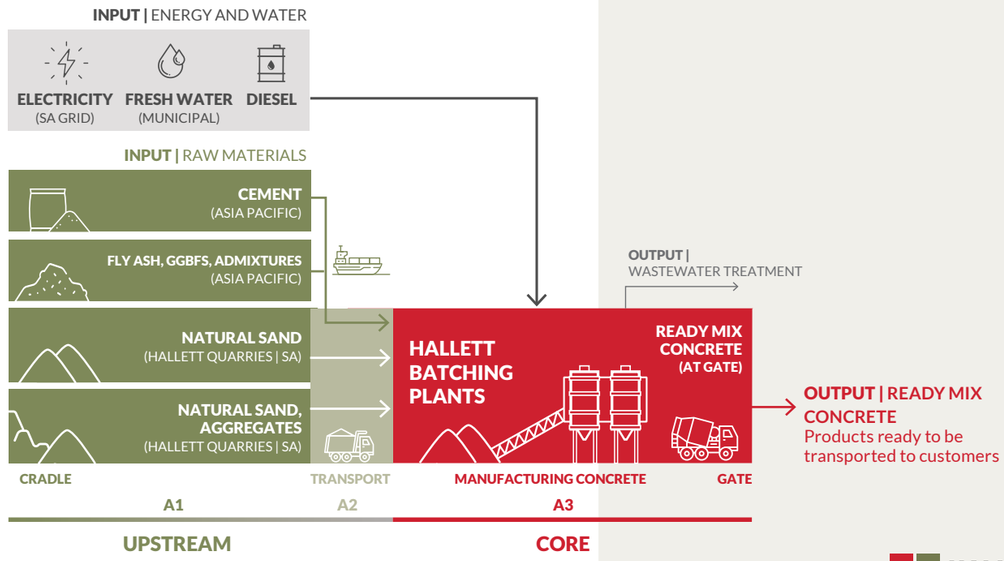
WHERE WE PRODUCE OUR READY MIX CONCRETE

Hallett manufactures Ready Mix concrete products at five batching plants around South Australia including:

1. **Dry Creek**
   140 Churchill Road North, Dry Creek
2. **Elizabeth**
   Womma Road, Elizabeth West
3. **Mile End**
   Cnr Railway Terrace and Manchester Street, Mile End
4. **McLaren Vale**
   Long Gully Road, McLaren Vale
5. **Osborne**
   Pelican Point Road, Outer Harbour

MANUFACTURING PROCESS

Figure 2. Manufacturing process - upstream and core activities



TECHNICAL INFORMATION

DECLARED UNIT

EPDs that do not cover the full product life cycle from raw material extraction through to end-of-life use the term “declared unit”, rather than functional unit. “Declared unit” will be used in this EPD and is defined as:

1 m^3 of Ready Mix concrete at the batching plant gate which is purchased by the customer and is paid for.

Ready Mix concrete by Hallett is used for buildings and infrastructure in a range of structural and decorative applications.

INDUSTRY CLASSIFICATION

The UN CPC and ANZSIC codes applicable to Hallett Ready Mix concrete products in this EPD are shown in Table 2.

Table 2. UN CPC and ANZSIC codes applicable to Hallett Ready Mix concrete products

Product	Classification	Category
Ready-mixed concrete	UN CPC 375	Articles of concrete, cement and plaster
	ANZSIC 20330	Concrete – Ready Mix – except Dry Mix

PRODUCT COMPOSITION

Hallett’s concrete products declared in this report are composed of the following materials:

Table 3. Material composition of Hallett’s Ready Mix concrete products

Constituents	portion of concrete by weight (%) Min	Max	Renewable material, weight (%)	Post-consumer recycled content (%)
Cement	5	10	0	0
Supplementary Cementitious Material (SCM)	5	10	0	0
Aggregate	35	48	0	0
Sand	25	40	0	0
Admixture	0.0	0.1	0	0
Water	7	10	0	0

Packaging does not apply for Ready Mix concrete.

Cement contains hexavalent chromium, which is listed as a Substance of Very High Concern (SVHC). (SVHC list is available at: https://echa.europa.eu/candidate-list-table). However, hexavalent chromium is only present in concrete as a trace element, which sits well below 0.1% concentration by mass.

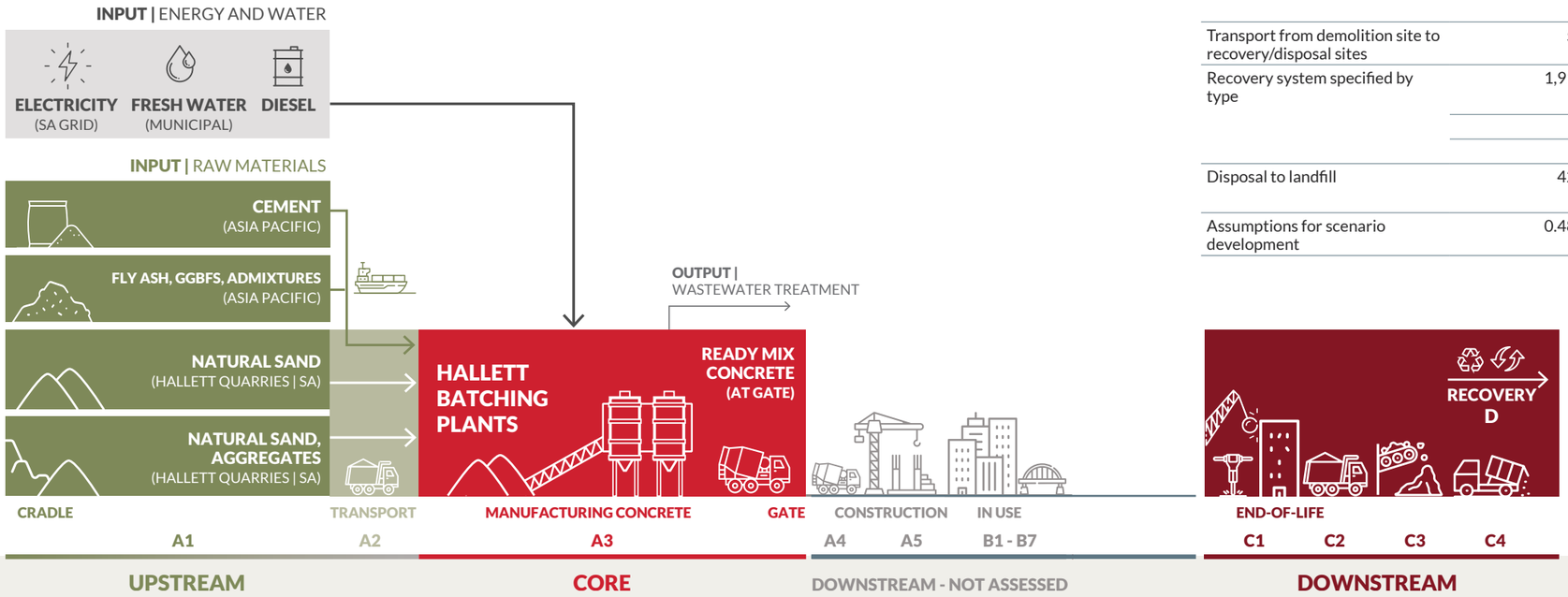
SYSTEM BOUNDARY

In Life Cycle Assessments (LCA), the system boundary is a line that divides the processes which are included from everything else. The system boundary of this EPD includes production (‘cradle-to-gate’, modules A1-A3), end-of-life (modules C1-C4) and the recovery potential of the concrete (module D) - as illustrated in Table 4 below.

Table 4. Modules included in the scope of the EPD (X = declared module | ND = module not declared)

	PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END-OF-LIFE				RECOVERY
	Raw material supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	AU, TH, VN	GLO	AU	-	-	-	-	-	-	-	-	-	AU	AU	AU	AU	AU
Specific data	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure 3. Manufacturing process - upstream, core, and downstream activities included in this EPD



UPSTREAM

A1 | Raw material supply

- Extraction and processing of raw materials.
- Generation of electricity from primary energy resources, also including their extraction, refining and transport. This includes energy needed for raw material supply and energy for manufacturing in core process.
- Processing up to the end-of-waste state.

A2 | Transportation

- Transport of raw materials to Hallett batching plants.

CORE

A3 | Manufacturing

- Material handling, concrete batching and mixing, washing down of plant and equipment, and production waste transport and disposal are included.

EXCLUDED | NOT ASSESSED

Modules A4 and A5 are not included in this EPD due to the wide variances in potential scenarios. Consequently, following streams are not included in this study:

- Any ready-mix concrete which is left over after a job is completed.
- Any concrete which is returned to the plant because of customers ordering more than what they need.
- Any concrete left in the trucks which comes out when the trucks are cleaned out and washed.

Table 5. End-of-life scenarios for concrete

Processes	Quantity per m3 of concrete	Unit	Additional information
Demolition	0.396	kg diesel for demolition	Module C1 | 100-kW construction excavator for demolition
Collection process specified by type	2,332	kg collected separately	
	0	kg collected with mixed construction waste	
Transport from demolition site to recovery/disposal sites	50	km transport	Module C2
Recovery system specified by type	1,912	kg for recycling	Module C3 | Recycled concrete is assumed to replace virgin crushed rock
	0	kg for re-use	
	0	kg for energy recovery	
Disposal to landfill	420	kg product or material for final deposition	Module C4
Assumptions for scenario development	0.487	kg diesel for disposal	Module C4 | 100-kW construction excavator for disposal

DOWNSTREAM

C1 | Deconstruction / demolition

- Demolition of the whole building including concrete, using a 100-kW construction excavator.

C2 | Transport

- Transport of concrete waste to waste processing.

C3 | Waste processing

- Processing of concrete waste into different waste flows. A high percentage of construction and demolition waste in Australia is recycled. However, understanding what percentage of Hallett products are recycled is not a straightforward task due to the lack of data. Consequently, using national waste report, 82% of concrete is estimated to be recycled at end-of-life and the rest is assumed to be landfilled (Blue Environment Pty Ltd, 2020).

C4 | Disposal

- 18% of concrete waste is disposed in landfill. An “Excavator, 100 kW, construction” dataset is used as a proxy (Sphera, 2022). Diesel rate is adjusted to reflect a proxy for landfill.

D | Resource recovery stage

- Potential related to the portion of concrete at the end-of-life which is recycled.
- To calculate the potential for recovery, it is assumed that recycled concrete will be used to replace virgin crushed rock.

LIFE CYCLE INVENTORY (LCI) DATA AND ASSUMPTIONS

Primary data were used for the batching plants and quarries for the period 1 July 2020 to 31 June 2021. Batching plant data were from Dry Creek, Elizabeth, Mile End, McLaren Vale, and Osborne, whereas quarry data were from Yaringa sands, Kulpara, McLaren Vale, Dry Creek, and Truro.

Background data (e.g. for energy and transport processes, cement and blast furnace slag) have predominantly been sourced from Sphera Professional Life Cycle Inventory Database 2022 (Sphera 2022), whereas South Australian electricity data were sourced from the AusLCI shadow database (v1.38). Most datasets have a reference year between 2016 and 2021 and all fall within the 10-year limit allowable for generic data under EN 15804.

UPSTREAM DATA

Cement

Hallett Group imports cement from 2 separate sources in the Asia Pacific region. Cement datasets were not available in the Sphera LCI Database 2022 (Sphera, 2022). For one cement source, a proxy Sphera dataset was chosen based on the verified cradle-to-gate carbon footprint results supplied by the cement manufacturer. For the second cement source, clinker production was first modelled using the LCI data from the ecoinvent database and Sphera background datasets. Cement production was subsequently modelled using the cement composition data supplied by the cement manufacturer.

Fly Ash

Fly ash is imported from an Asian source, which is a by-product of coal combustion in power stations in India. Fly ash is treated as a waste material and only includes transport impact. If the dust was not utilised as a supplementary cementitious material, this material would otherwise have been landfilled and hence is classified as waste.

Ground Granulated Blast Furnace Slag (GGBFS)

Hallett imports Ground Granulated Blast Furnace Slag (GGBFS, a supplementary cementitious material) from a source in Asia. Blast furnace slag is a by-product in the blast furnace steel production process and receives some environmental impacts from pig iron production.

ELECTRICITY

Electricity has been modelled for core processes using the AusLCI data for the electricity mix used in the South Australia. The GWP-GHG of the electricity is 0.454 kg CO_2eq./kWh.

RECYCLING

In Australia, the resource recovery and recycling rate for masonry materials was 82% in 2018/19 (Blue Environment Pty Ltd, 2020). Based on this source, it has been assumed that 82% of concrete is recycled at end-of-life and the rest is landfilled.

TRANSPORT

Primary transport data was used for transport of production inputs (A2). Any wastes from the production process (A3) are assumed to be transported over a 50 km distance to a treatment or disposal site.

Transport modes:

- Truck (diesel), Euro 0 - 6 mix, 34 - 40 t gross weight / 27 t payload capacity.
- Container ship (heavy fuel oil), 5,000 to 200,000 dwt payload capacity, ocean going.
- Bulk commodity carrier, 5,000 to 200,000 dwt payload capacity, ocean going.

CUT-OFF CRITERIA

Personnel is excluded as per section 4.3.1 in the PCR (EPD International, 2021). Thinkstep-anz consistently excludes environmental impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process, ('capital goods') regardless of potential significance. High-quality infrastructure related data isn't always available and there is no clear cut-off for what to include. For this reason, capital goods data are applied to LCA studies inconsistently. This is expected to lead to reduced consistency and comparability of EPDs. Capital goods were previously excluded from EPDs, thus including capital goods in current EPDs would further reduce their comparability.

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

All other reported data were incorporated and modelled using the best available life cycle inventory data.

LIFE CYCLE INVENTORY (LCI) DATA AND ASSUMPTIONS - CONTINUED

ALLOCATION

Ready Mix concrete

Hallett produces a range of Ready Mix concrete products at its batching plants. Energy use for concrete production has been allocated to the products based on a volume basis (total m^3 of Ready 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.

Ground Granulated Blast Furnace Slag

Blast Furnace Slag is a by-product in the blast furnace steel production process. There is a significant demand for slag globally – especially in the Portland cement and concrete industry which drives the price of the slag globally. We used the Sphera dataset, which allocates the impacts between steel and blast furnace slag by using economic allocation (Sphera 2022). This allocation decision influences the environmental profile of concrete mixes that use GGBFS.

End-of-life

End-of-life allocation follows the requirements of EN15804:2012+A2:2019 § 6.4.3.3 and generally follows the polluter pays principle.

SOFTWARE AND DATABASE

The LCA software used is the LCA for Experts from Sphera, using the Sphera LCI Database 2022 (Sphera, 2022).

KEY ASSUMPTIONS

CO_2 absorption

CO_2 absorption from carbonation is not considered due to high variability and uncertainty and to be conservative.

Recycled concrete

To calculate the potential for recovery, it is assumed that recycled concrete will be used to replace virgin crushed rock.

ENVIRONMENTAL IMPACT INDICATORS

An introduction the core environmental impact indicators is provided below. The best-known effect of each indicator is listed in the descriptions and the abbreviations, in brackets, correspond to the labels in the following results tables.

Table 6. Environmental impact indicators described

Indicator and description
Global Warming Potential (GWPt, GWPf, GWPb, GWPluluc) A measure of greenhouse gas emissions, such as CO_2 and methane. These emissions are causing an increase in the absorption of radiation emitted by the sun, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare. The Global Warming Potential (GWP) includes four sub indicators: total (GWPt), fossil (GWPf), biogenic (GWPb), and land-use and land-use change (GWPluluc).
Ozone Depletion Potential (ODP) Depletion of the ozone layer leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants. The Ozone Depletion Potential is a measure of air emissions that contribute to the depletion of the stratospheric ozone layer.
Acidification potential (AP) A measure of emissions that cause acidifying effects to the environment. Acidification potential is a measure of a molecule's capacity to increase the hydrogen ion (H+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline and the deterioration of building materials.
Eutrophication Potential (EPfw, EPm, EPt) Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P). In aquatic ecosystems where this term is mostly applied, this typically describes a degradation in water quality. Eutrophication can result in an undesirable change in the type of species that flourish and an increase in the production of biomass. As the decomposition of biomass consumes oxygen, eutrophication may decrease the available oxygen level in the water column and threaten fish in their ability to respire.
Photochemical Ozone Creation Potential (POCP) Photochemical Ozone Creation Potential gives an indication of the emissions from precursors that contribute to ground level smog formation, mainly ozone (O_3). Ground level ozone may be harmful to human health and ecosystems and may also damage crops. These emissions are produced by the reaction of volatile organic compounds (VOCs) and carbon monoxide in the presence of nitrogen oxides and UV light.
Abiotic Resource Depletion (ADPmm, ADPf) The consumption of non-renewable resources decreases the availability of these resources and their associated functions in the future. Depletion of mineral resources and non-renewable energy resources are reported separately. Depletion of mineral resources is assessed based on total reserves.
Water Depletion Potential (WDP) Water scarcity is a measure of the stress on a region due to water consumption.

INDICATOR TYPES

The following tables show the results grouped in seven categories, each looking at different types of indicators. The headings below provide descriptions for each of these categories. Each column of numbers represents one declared unit: 1 m^3 of Ready Mix concrete at the batching plant gate which is purchased by the customer and is paid for.

CORE ENVIRONMENTAL IMPACT INDICATORS | EN15804+A2

The reported impact categories represent impact potentials, i.e., they are approximations of environmental impacts that could occur if the emissions would (a) follow the underlying impact pathway and (b) meet certain conditions in the receiving environment while doing so. The environmental impact results are therefore relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks.

Long-term emissions (>100 years) are not taken into consideration in the impact estimate.

Table 7. Core environmental impact indicators EN15804+A2

Indicator	abbr.
Climate change (total)	GWPt
Climate change (fossil)	GWPf
Climate change (biogenic)	GWPb
Climate change (land use and land use change)	GWPluluc
Ozone depletion	ODP
Acidification potential	AP
Eutrophication potential - freshwater	EPfw
Eutrophication potential - marine	EPm
Eutrophication potential - terrestrial	EPt
Photochemical ozone creation potential	POCP
Abiotic depletion potential – minerals & metals	ADPmm
Abiotic depletion potential – fossil fuels	ADPf
Water Depletion Potential	WDP

RESOURCE USE INDICATORS

The resource use indicators describe the use of renewable and non-renewable material resources, renewable and non- renewable primary energy and water.

Note: Water consumption: The FW indicator in the EPD results tables reports consumption (i.e. net use) of 'blue water' (which includes river water, lake water and ground water). This indicator deliberately excludes consumption of 'green water' (rain water), as net loss should be interpreted as any additional water loss beyond what would occur in the original, natural system.

Table 8. Life cycle inventory indicators on use of resources

Indicator	abbr.
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE
Use of renewable primary energy resources used as raw materials	PERM
Total use of renewable primary energy resources	PERT
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE
Use of non-renewable primary energy resources used as raw materials	PENRM
Total use of non-renewable primary energy resources	PENRT
Use of secondary material;	SM
Use of renewable secondary fuels	RSF
Use of non-renewable secondary fuels	NRSF
Total use of net fresh water	FW

WASTE CATEGORIES AND OUTPUT FLOWS

Waste indicators describe waste generated within the life cycle of the product. Waste is categorised by hazard class. Output flows are categorised by receiving compartment or type of exported energy.

BIOGENIC CARBON INDICATORS

Biogenic carbon refers to the carbon stored in organic materials. This is sequestered during growth and released at end-of-life. EN15804+A2 requires the declaration of biogenic carbon content of the product and its packaging.

Packaging does not apply for Ready Mix concrete.

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

These indicators are voluntarily included to facilitate modularity where an EPD is used as input data for creating another EPD downstream in the value chain (EPD International, 2021).

**This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR.

ENVIRONMENTAL IMPACT INDICATORS | EN15804+A1

EN 15804+A1 core environmental impact categories aid with historical comparison and are used within various rating tools.

Table 9. Life cycle inventory indicators on waste categories and output flows

Indicator	abbr.
Hazardous waste disposed	HWD
Non-hazardous waste disposed	NHWD
Radioactive waste disposed	RWD
Components for reuse	CRU
Materials for energy recovery	MER
Materials for recycling	MFR
Exported electrical energy	EEE
Exported thermal energy	EET

Table 10. Biogenic carbon indicators

Indicator	abbr.
Biogenic carbon content in product	BCC-prod
Biogenic carbon content in packaging	BCC-pack

Table 11. Additional environmental impact indicators

Indicator	abbr.
IPCC AR5 GWP-GHG**	GWP-GHG
Particulate matter emissions	PM
Ionising radiation – human health	IRP
Eco-toxicity (freshwater)	ETPfw
Human toxicity, cancer	HTPc
Human toxicity, non-cancer	HTPnc
Soil quality	SQP

Table 12. Environmental impact indicators EN15804+A1

Indicator	abbr.
Global warming potential (total)	GWP
Ozone depletion potential	ODP
Acidification potential of land and water	AP
Eutrophication potential	EP
Photochemical ozone creation potential	POCP
Depletion abiotic resources - minerals & metals	ADPE
Depletion abiotic resources - fossil fuels	ADPF

DRY CREEK | A1-A3

CORE ENVIRONMENTAL IMPACT INDICATORS | EN15804+A2

Table 13. Module A1-A3 Core environmental impact indicator results for 1 m^3 of product produced at Dry Creek batch plant

		DRY CREEK | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWPt	kg CO_2-eq	275	203	206	162	301	221	225	171	176	344	251	255	192	198	412	299	304	227	234	506	365	370	274	282
GWPf	kg CO_2-eq	272	201	203	159	298	219	222	168	173	340	248	253	190	196	408	296	301	224	231	502	362	366	271	279
GWPb	kg CO_2-eq	3.00	2.52	2.51	2.18	3.19	2.65	2.64	2.28	2.27	3.51	2.89	2.88	2.47	2.45	4.00	3.25	3.24	2.72	2.71	4.60	3.66	3.65	3.01	3.00
GWPluluc	kg CO_2-eq	0.0175	0.0127	0.0134	0.0111	0.0192	0.0138	0.0148	0.0109	0.0122	0.0220	0.0158	0.0169	0.0124	0.0139	0.0266	0.0190	0.0201	0.0147	0.0165	0.0329	0.0234	0.0246	0.0179	0.0200
ODP	kg CFC-11 eq	6.65E-08	7.12E-08	6.96E-08	6.92E-08	6.31E-08	6.69E-08	6.54E-08	6.73E-08	6.50E-08	5.02E-08	5.39E-08	5.28E-08	5.42E-08	5.23E-08	3.47E-08	3.84E-08	3.75E-08	3.84E-08	3.71E-08	2.90E-08	3.36E-08	3.27E-08	3.36E-08	3.22E-08
AP	Mole of H+eq	0.779	0.631	0.712	0.706	0.832	0.668	0.772	0.628	0.766	0.918	0.729	0.841	0.675	0.834	1.06	0.827	0.946	0.749	0.937	1.25	0.962	1.09	0.847	1.08
EPfw	kg P eq	2.15E-04	2.03E-04	2.04E-04	1.97E-04	2.19E-04	2.06E-04	2.07E-04	1.98E-04	2.00E-04	2.26E-04	2.11E-04	2.12E-04	2.02E-04	2.03E-04	2.38E-04	2.19E-04	2.21E-04	2.08E-04	2.10E-04	2.53E-04	2.30E-04	2.31E-04	2.15E-04	2.18E-04
EPm	kg N eq	0.258	0.211	0.220	0.199	0.275	0.223	0.234	0.196	0.211	0.303	0.242	0.255	0.210	0.228	0.348	0.274	0.288	0.234	0.255	0.410	0.318	0.332	0.265	0.291
EPt	Mole of N eq	2.85	2.32	2.42	2.19	3.04	2.45	2.58	2.15	2.32	3.35	2.67	2.81	2.31	2.51	3.85	3.03	3.17	2.57	2.80	4.54	3.51	3.66	2.91	3.20
POCP	kg NMVOC eq	0.690	0.557	0.584	0.527	0.737	0.590	0.626	0.515	0.563	0.817	0.645	0.684	0.556	0.611	0.944	0.734	0.775	0.621	0.686	1.12	0.856	0.899	0.709	0.787
ADPmm*	kg Sb-eq	4.44E-06	3.37E-06	3.46E-06	2.86E-06	4.83E-06	3.64E-06	3.77E-06	2.93E-06	3.10E-06	5.41E-06	4.03E-06	4.16E-06	3.20E-06	3.39E-06	6.44E-06	4.74E-06	4.88E-06	3.71E-06	3.94E-06	7.86E-06	5.74E-06	5.89E-06	4.43E-06	4.71E-06
ADPf*	MJ	1,180	960	1,000	900	1,260	1,020	1,070	890	960	1,390	1,110	1,160	960	1,040	1,600	1,260	1,310	1,070	1,160	1,880	1,460	1,520	1,210	1,320
WDP*	m^3 world equiv	11.8	10.0	10.5	9.75	12.4	10.4	10.9	9.31	10.1	13.4	11.1	11.7	9.90	10.7	15.0	12.3	12.9	10.8	11.7	17.1	13.9	14.5	12.0	13.0

*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.

DRY CREEK | A1-A3

RESOURCE USE INDICATORS

Table 14. Module A1-A3 Resource use indicators results for 1 m^3 of product produced at Dry Creek batch plant

		DRY CREEK | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
PERE	MJ	113	80.5	83.1	64.4	125	88.7	92.1	66.9	71.4	144	102	106	76.7	81.9	175	124	128	92.5	98.6	218	154	158	114	122
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	113	80.5	83.1	64.4	125	88.7	92.1	66.9	71.4	144	102	106	76.7	81.9	175	124	128	92.5	98.6	218	154	158	114	122
PENRE	MJ	1,180	960	1,000	900	1,260	1,020	1,070	890	960	1,390	1,110	1,160	960	1,040	1,600	1,260	1,320	1,070	1,160	1,880	1,460	1,520	1,210	1,330
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1,180	960	1,000	900	1,260	1,020	1,070	890	960	1,390	1,110	1,160	960	1,040	1,600	1,260	1,320	1,070	1,160	1,880	1,460	1,520	1,210	1,330
SM	kg	0.0826	49.7	49.7	106	0.0914	63.9	63.9	127	127	0.106	69.0	69.0	142	142	0.130	73.0	73.0	162	162	0.162	76.1	76.1	187	187
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	0.487	0.416	0.435	0.405	0.509	0.431	0.453	0.389	0.421	0.550	0.461	0.484	0.413	0.446	0.614	0.507	0.531	0.448	0.485	0.701	0.570	0.595	0.495	0.537

WASTE CATEGORIES AND OUTPUT FLOWS

Table 15. Module A1-A3 Waste categories and output flows results for 1 m^3 of product produced at Dry Creek batch plant

		DRY CREEK | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
HWD	kg	0.00273	0.00244	0.00244	0.00243	0.00298	0.00273	0.00273	0.00272	0.00272	0.00298	0.00264	0.00264	0.00263	0.00263	0.00364	0.00314	0.00314	0.00313	0.00313	0.00455	0.00380	0.00380	0.00379	0.00379
NHWD	kg	1.48	1.31	1.32	1.22	1.55	1.36	1.37	1.24	1.25	1.67	1.45	1.47	1.32	1.33	1.84	1.58	1.59	1.41	1.43	2.04	1.72	1.73	1.50	1.52
RWD	kg	0.0271	0.0192	0.0192	0.0140	0.0299	0.0212	0.0212	0.0155	0.0155	0.0346	0.0244	0.0245	0.0178	0.0178	0.0422	0.0298	0.0298	0.0216	0.0217	0.0526	0.0371	0.0371	0.0269	0.0270
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1	30.1
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DRY CREEK | A1-A3

BIOGENIC CARBON INDICATORS

Table 16. Module A1-A3 Biogenic carbon indicators results for 1 m^3 of product produced at Dry Creek batch plant

		DRY CREEK | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
BCC-prod	kg C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

Table 17. Module A1-A3 Additional environmental impact indicators results for 1 m^3 of product produced at Dry Creek batch plant

		DRY CREEK | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP-GHG**	kg CO_2-eq	270	200	202	158	296	217	221	168	172	338	247	251	189	195	406	295	299	223	230	499	360	364	270	278
PM	Disease incidences	9.48E-06	7.81E-06	8.40E-06	7.98E-06	1.01E-05	8.23E-06	9.00E-06	7.50E-06	8.52E-06	1.11E-05	8.91E-06	9.74E-06	8.02E-06	9.19E-06	1.27E-05	1.00E-05	1.09E-05	8.85E-06	1.02E-05	1.49E-05	1.16E-05	1.25E-05	9.96E-06	1.16E-05
IRP***	kBq U235 eq.	4.50	3.18	3.18	2.30	4.98	3.51	3.51	2.54	2.54	5.76	4.06	4.06	2.93	2.94	7.03	4.95	4.95	3.57	3.57	8.77	6.17	6.17	4.45	4.45
ETP-fw*	CTUe	431	354	357	311	459	374	379	321	327	507	408	413	346	353	581	460	466	384	392	682	531	537	434	445
HTPc*	CTUh	2.80E-08	2.06E-08	2.08E-08	1.61E-08	3.07E-08	2.24E-08	2.28E-08	1.71E-08	1.76E-08	3.51E-08	2.56E-08	2.59E-08	1.94E-08	1.99E-08	4.23E-08	3.05E-08	3.09E-08	2.30E-08	2.35E-08	5.20E-08	3.74E-08	3.78E-08	2.78E-08	2.85E-08
HTPnc*	CTUh	2.45E-06	1.76E-06	1.77E-06	1.32E-06	2.70E-06	1.93E-06	1.95E-06	1.43E-06	1.45E-06	3.11E-06	2.22E-06	2.23E-06	1.64E-06	1.66E-06	3.77E-06	2.68E-06	2.70E-06	1.97E-06	1.99E-06	4.67E-06	3.31E-06	3.33E-06	2.42E-06	2.45E-06
SQP*	Pt	266	250	249	235	274	255	254	241	239	287	266	266	249	248	303	278	277	257	256	316	286	286	259	259

ENVIRONMENTAL IMPACT INDICATORS | EN15804+A1

Table 18. Module A1-A3 Environmental impact indicators EN15804+A1 for 1 m^3 of product produced at Dry Creek batch plant

		DRY CREEK | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP	kg CO_2-eq	272	201	204	160	298	219	223	169	174	340	249	253	190	196	408	296	301	225	231	502	362	366	271	279
ODP	kg CFC_{11}-eq.	4.64E-08	4.95E-08	4.84E-08	4.82E-08	4.40E-08	4.66E-08	4.56E-08	4.68E-08	4.53E-08	3.51E-08	3.76E-08	3.68E-08	3.78E-08	3.65E-08	2.44E-08	2.69E-08	2.63E-08	2.69E-08	2.59E-08	2.05E-08	2.36E-08	2.30E-08	2.36E-08	2.26E-08
AP	kg SO_2-eq	0.586	0.474	0.543	0.548	0.627	0.502	0.592	0.478	0.598	0.693	0.549	0.646	0.515	0.652	0.801	0.624	0.727	0.572	0.735	0.949	0.728	0.835	0.648	0.845
EP	kg PO_4^{3-}-eq.	0.0900	0.0736	0.0767	0.0694	0.0959	0.0778	0.0817	0.0684	0.0737	0.106	0.0847	0.0890	0.0735	0.0796	0.121	0.0957	0.100	0.0816	0.0888	0.143	0.111	0.115	0.0924	0.101
POCP	kg C_2H_4-eq.	0.0255	0.0159	0.0191	0.0164	0.0288	0.0183	0.0224	0.0140	0.0194	0.0343	0.0221	0.0265	0.0168	0.0230	0.0434	0.0284	0.0331	0.0215	0.0288	0.0559	0.0373	0.0421	0.0279	0.0368
ADPE	kg Sb eq.	4.62E-06	3.49E-06	3.59E-06	2.95E-06	5.02E-06	3.78E-06	3.90E-06	3.03E-06	3.20E-06	5.63E-06	4.18E-06	4.32E-06	3.31E-06	3.50E-06	6.70E-06	4.93E-06	5.07E-06	3.84E-06	4.08E-06	8.19E-06	5.97E-06	6.12E-06	4.60E-06	4.88E-06
ADPF	MJ	1,100	910	950	860	1,170	960	1,010	850	920	1,290	1,040	1,090	910	990	1,480	1,170	1,230	1,010	1,100	1,730	1,350	1,410	1,140	1,250

*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

**This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR

***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.

ELIZABETH | A1-A3

CORE ENVIRONMENTAL IMPACT INDICATORS | EN15804+A2

Table 19. Module A1-A3 Core environmental impact indicator results for 1 m^3 of product produced at Elizabeth batch plant

		ELIZABETH | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWPt	kg CO_2-eq	281	209	212	168	306	227	231	177	181	349	257	261	198	204	417	304	308	232	239	510	370	374	279	287
GWPf	kg CO_2-eq	277	206	209	165	302	224	228	174	179	345	253	257	195	201	412	301	305	229	236	505	366	370	276	284
GWPb	kg CO_2-eq	3.33	2.85	2.84	2.51	3.51	2.98	2.97	2.62	2.60	3.84	3.22	3.21	2.79	2.78	4.31	3.56	3.55	3.04	3.02	4.92	3.98	3.97	3.33	3.31
GWPluluc	kg CO_2-eq	0.0175	0.0127	0.0135	0.0112	0.0192	0.0139	0.0149	0.0110	0.0123	0.0220	0.0159	0.0169	0.0124	0.0139	0.0266	0.0190	0.0201	0.0147	0.0165	0.0328	0.0234	0.0246	0.0179	0.0200
ODP	kg CFC-11 eq	6.60E-08	7.07E-08	6.91E-08	6.87E-08	6.26E-08	6.64E-08	6.49E-08	6.68E-08	6.45E-08	4.98E-08	5.35E-08	5.23E-08	5.37E-08	5.19E-08	3.43E-08	3.80E-08	3.70E-08	3.80E-08	3.66E-08	2.86E-08	3.32E-08	3.23E-08	3.31E-08	3.17E-08
AP	Mole of H+eq	0.767	0.620	0.700	0.694	0.818	0.656	0.759	0.615	0.753	0.904	0.715	0.827	0.662	0.820	1.04	0.812	0.930	0.734	0.921	1.24	0.947	1.07	0.832	1.06
EPfw	kg P eq	2.16E-04	2.04E-04	2.05E-04	1.98E-04	2.20E-04	2.07E-04	2.08E-04	1.99E-04	2.00E-04	2.27E-04	2.12E-04	2.13E-04	2.03E-04	2.04E-04	2.38E-04	2.20E-04	2.21E-04	2.08E-04	2.10E-04	2.54E-04	2.31E-04	2.32E-04	2.16E-04	2.18E-04
EPm	kg N eq	0.264	0.217	0.226	0.205	0.281	0.229	0.240	0.202	0.217	0.309	0.248	0.261	0.216	0.234	0.353	0.279	0.293	0.239	0.260	0.415	0.323	0.337	0.270	0.296
EPt	Mole of N eq	2.92	2.39	2.49	2.26	3.10	2.52	2.65	2.22	2.39	3.41	2.74	2.88	2.38	2.57	3.90	3.08	3.23	2.63	2.86	4.59	3.56	3.71	2.97	3.25
POCP	kg NMVOC eq	0.692	0.559	0.587	0.530	0.738	0.591	0.627	0.517	0.564	0.816	0.646	0.684	0.557	0.611	0.942	0.733	0.774	0.620	0.685	1.11	0.855	0.897	0.708	0.786
ADPmm*	kg Sb-eq	4.56E-06	3.49E-06	3.59E-06	2.99E-06	4.94E-06	3.76E-06	3.88E-06	3.06E-06	3.22E-06	5.52E-06	4.14E-06	4.27E-06	3.31E-06	3.50E-06	6.53E-06	4.84E-06	4.98E-06	3.81E-06	4.04E-06	7.95E-06	5.83E-06	5.99E-06	4.53E-06	4.81E-06
ADPf*	MJ	1,260	1,050	1,090	990	1,340	1,100	1,150	980	1,040	1,470	1,190	1,240	1,040	1,120	1,670	1,330	1,390	1,150	1,240	1,950	1,530	1,590	1,290	1,400
WDP*	m^3 world equiv	12.1	10.3	10.8	10.0	12.5	10.6	11.1	9.51	10.3	13.5	11.2	11.8	10.0	10.9	14.9	12.3	12.9	10.8	11.7	17.1	13.9	14.5	12.0	13.0

*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.

ELIZABETH | A1-A3

RESOURCE USE INDICATORS

Table 20. Module A1-A3 Resource use indicators results for 1 m^3 of product produced at Elizabeth batch plant

		ELIZABETH | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
PERE	MJ	113	80.7	83.3	64.7	125	88.8	92.2	67.1	71.6	144	102	106	76.9	82.0	175	124	128	92.6	98.7	218	154	158	114	121
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	113	80.7	83.3	64.7	125	88.8	92.2	67.1	71.6	144	102	106	76.9	82.0	175	124	128	92.6	98.7	218	154	158	114	121
PENRE	MJ	1,260	1,050	1,090	990	1,340	1,100	1,150	980	1,040	1,470	1,190	1,240	1,040	1,120	1,670	1,330	1,390	1,150	1,240	1,950	1,530	1,590	1,290	1,400
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1,260	1,050	1,090	990	1,340	1,100	1,150	980	1,040	1,470	1,190	1,240	1,040	1,120	1,670	1,330	1,390	1,150	1,240	1,950	1,530	1,590	1,290	1,400
SM	kg	0.0822	49.5	49.5	106	0.0910	63.6	63.6	126	126	0.106	68.7	68.7	141	141	0.129	72.7	72.7	161	161	0.161	75.8	75.8	187	187
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	0.495	0.423	0.443	0.413	0.514	0.436	0.458	0.395	0.426	0.553	0.464	0.487	0.416	0.449	0.612	0.506	0.530	0.447	0.483	0.699	0.569	0.593	0.494	0.535

WASTE CATEGORIES AND OUTPUT FLOWS

Table 21. Module A1-A3 Waste categories and output flows results for 1 m^3 of product produced at Elizabeth batch plant

		ELIZABETH | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
HWD	kg	0.00272	0.00243	0.00243	0.00242	0.00297	0.00271	0.00271	0.00271	0.00271	0.00297	0.00263	0.00263	0.00262	0.00262	0.00363	0.00312	0.00312	0.00311	0.00311	0.00453	0.00378	0.00378	0.00377	0.00377
NHWD	kg	1.29	1.13	1.13	1.03	1.35	1.17	1.18	1.05	1.06	1.47	1.26	1.27	1.12	1.14	1.64	1.39	1.40	1.22	1.24	1.84	1.53	1.54	1.31	1.33
RWD	kg	0.0270	0.0191	0.0191	0.0140	0.0298	0.0211	0.0212	0.0154	0.0155	0.0344	0.0244	0.0244	0.0177	0.0178	0.0420	0.0297	0.0297	0.0215	0.0216	0.0524	0.0370	0.0370	0.0268	0.0269
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELIZABETH | A1-A3

BIOGENIC CARBON INDICATORS

Table 22. Module A1-A3 Biogenic carbon indicators results for 1 m^3 of product produced at Elizabeth batch plant

		ELIZABETH | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
BCC-prod	kg C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

Table 23. Module A1-A3 Additional environmental impact indicators results for 1 m^3 of product produced at Elizabeth batch plant

		ELIZABETH | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP-GHG**	kg CO_2-eq	276	205	208	164	301	223	226	173	178	343	252	256	194	200	410	299	303	228	234	502	364	368	274	282
PM	Disease incidences	8.81E-06	7.14E-06	7.73E-06	7.31E-06	9.39E-06	7.55E-06	8.31E-06	6.82E-06	7.84E-06	1.04E-05	8.22E-06	9.05E-06	7.33E-06	8.50E-06	1.19E-05	9.32E-06	1.02E-05	8.13E-06	9.52E-06	1.41E-05	1.08E-05	1.18E-05	9.24E-06	1.09E-05
IRP***	kBq U235 eq.	4.48	3.17	3.17	2.30	4.96	3.50	3.50	2.53	2.54	5.74	4.04	4.05	2.92	2.93	7.00	4.93	4.93	3.56	3.56	8.74	6.14	6.15	4.43	4.44
ETP-fw*	CTUe	469	393	396	349	496	412	416	359	365	543	444	449	382	389	615	495	500	418	427	716	565	571	469	479
HTPc*	CTUh	2.86E-08	2.11E-08	2.14E-08	1.67E-08	3.12E-08	2.30E-08	2.33E-08	1.77E-08	1.81E-08	3.56E-08	2.61E-08	2.64E-08	1.99E-08	2.04E-08	4.27E-08	3.10E-08	3.14E-08	2.35E-08	2.40E-08	5.24E-08	3.78E-08	3.82E-08	2.83E-08	2.90E-08
HTPnc*	CTUh	2.46E-06	1.78E-06	1.79E-06	1.34E-06	2.71E-06	1.95E-06	1.96E-06	1.45E-06	1.47E-06	3.12E-06	2.23E-06	2.25E-06	1.65E-06	1.68E-06	3.77E-06	2.69E-06	2.71E-06	1.98E-06	2.01E-06	4.67E-06	3.32E-06	3.34E-06	2.43E-06	2.46E-06
SQP*	Pt	284	269	268	254	290	271	271	257	256	301	280	280	264	262	313	288	288	267	266	326	296	296	269	270

ENVIRONMENTAL IMPACT INDICATORS | EN15804+A1

Table 24. Module A1-A3 Environmental impact indicators EN15804+A1 for 1 m^3 of product produced at Elizabeth batch plant

		ELIZABETH | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP	kg CO_2-eq	278	207	210	166	303	224	228	175	179	345	254	258	196	201	413	301	305	230	236	506	366	371	276	284
ODP	kg CFC_{11}-eq.	4.60E-08	4.92E-08	4.81E-08	4.78E-08	4.36E-08	4.62E-08	4.52E-08	4.65E-08	4.49E-08	3.48E-08	3.73E-08	3.65E-08	3.74E-08	3.62E-08	2.41E-08	2.66E-08	2.60E-08	2.66E-08	2.56E-08	2.02E-08	2.33E-08	2.27E-08	2.33E-08	2.23E-08
AP	kg SO_2-eq	0.573	0.460	0.530	0.535	0.612	0.488	0.578	0.464	0.583	0.678	0.534	0.631	0.501	0.637	0.785	0.608	0.711	0.557	0.719	0.932	0.712	0.818	0.632	0.828
EP	kg PO_4^{3-}-eq.	0.0921	0.0759	0.0789	0.0716	0.0979	0.0799	0.0838	0.0705	0.0758	0.108	0.0866	0.0909	0.0755	0.0815	0.123	0.0974	0.102	0.0833	0.0905	0.144	0.112	0.117	0.0941	0.103
POCP	kg C_2H_4-eq.	0.0139	0.00440	0.00754	0.00485	0.0172	0.00676	0.0108	0.00243	0.00782	0.0227	0.0106	0.0149	0.00530	0.0114	0.0317	0.0169	0.0215	0.00995	0.0172	0.0442	0.0256	0.0304	0.0163	0.0251
ADPE	kg Sb eq.	4.73E-06	3.61E-06	3.71E-06	3.08E-06	5.13E-06	3.89E-06	4.02E-06	3.15E-06	3.32E-06	5.74E-06	4.29E-06	4.43E-06	3.43E-06	3.62E-06	6.80E-06	5.03E-06	5.17E-06	3.95E-06	4.18E-06	8.28E-06	6.07E-06	6.22E-06	4.70E-06	4.98E-06
ADPF	MJ	1,190	990	1,030	950	1,250	1,040	1,090	930	1,000	1,370	1,120	1,170	990	1,070	1,550	1,250	1,310	1,080	1,170	1,810	1,430	1,490	1,210	1,320

*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

**This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR

***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.

MILE END | A1-A3

CORE ENVIRONMENTAL IMPACT INDICATORS | EN15804+A2

Table 25. Module A1-A3 Core environmental impact indicator results for 1 m^3 of product produced at Mile End batch plant

		MILE END | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWPt	kg CO_2-eq	266	195	198	154	291	213	216	163	168	334	242	246	184	190	402	290	294	218	225	495	355	360	265	273
GWPf	kg CO_2-eq	263	192	195	151	288	210	214	160	165	330	240	244	182	188	398	287	291	216	222	490	352	356	262	270
GWPb	kg CO_2-eq	2.87	2.40	2.39	2.06	3.06	2.53	2.52	2.17	2.15	3.39	2.77	2.76	2.35	2.34	3.87	3.12	3.11	2.61	2.59	4.47	3.54	3.52	2.89	2.87
GWPluluc	kg CO_2-eq	0.0171	0.0124	0.0131	0.0108	0.0188	0.0135	0.0145	0.0106	0.0119	0.0216	0.0155	0.0165	0.0121	0.0136	0.0261	0.0186	0.0198	0.0144	0.0161	0.0324	0.0230	0.0242	0.0175	0.0196
ODP	kg CFC-11 eq	6.62E-08	7.07E-08	6.92E-08	6.88E-08	6.27E-08	6.65E-08	6.51E-08	6.69E-08	6.46E-08	5.00E-08	5.37E-08	5.25E-08	5.39E-08	5.21E-08	3.46E-08	3.83E-08	3.74E-08	3.83E-08	3.70E-08	2.90E-08	3.35E-08	3.26E-08	3.35E-08	3.21E-08
AP	Mole of H+eq	0.641	0.495	0.575	0.569	0.693	0.532	0.634	0.491	0.628	0.779	0.591	0.702	0.538	0.695	0.918	0.688	0.806	0.611	0.797	1.11	0.822	0.945	0.708	0.933
EPfw	kg P eq	2.12E-04	2.01E-04	2.02E-04	1.95E-04	2.17E-04	2.04E-04	2.05E-04	1.96E-04	1.97E-04	2.24E-04	2.09E-04	2.10E-04	1.99E-04	2.01E-04	2.35E-04	2.17E-04	2.18E-04	2.05E-04	2.07E-04	2.51E-04	2.28E-04	2.29E-04	2.13E-04	2.15E-04
EPm	kg N eq	0.220	0.173	0.182	0.162	0.237	0.185	0.197	0.158	0.174	0.265	0.205	0.217	0.173	0.191	0.309	0.236	0.249	0.196	0.217	0.371	0.279	0.293	0.227	0.252
EPt	Mole of N eq	2.43	1.91	2.01	1.78	2.61	2.04	2.17	1.74	1.91	2.92	2.26	2.39	1.90	2.09	3.42	2.60	2.75	2.15	2.38	4.10	3.08	3.23	2.49	2.77
POCP	kg NMVOC eq	0.585	0.453	0.480	0.424	0.632	0.486	0.521	0.412	0.459	0.710	0.540	0.579	0.453	0.506	0.835	0.628	0.669	0.516	0.580	1.01	0.749	0.791	0.603	0.680
ADPmm*	kg Sb-eq	4.29E-06	3.23E-06	3.32E-06	2.73E-06	4.68E-06	3.50E-06	3.62E-06	2.80E-06	2.96E-06	5.25E-06	3.88E-06	4.01E-06	3.06E-06	3.25E-06	6.26E-06	4.58E-06	4.73E-06	3.56E-06	3.79E-06	7.67E-06	5.57E-06	5.72E-06	4.27E-06	4.55E-06
ADPf*	MJ	1,080	870	910	810	1,160	930	980	800	870	1,290	1,020	1,070	870	950	1,500	1,160	1,220	980	1,070	1,780	1,360	1,420	1,120	1,230
WDP*	m^3 world equiv	10.1	8.31	8.81	8.06	10.6	8.66	9.21	7.59	8.38	11.6	9.36	9.93	8.14	8.97	13.1	10.5	11.0	8.97	9.87	15.2	12.0	12.6	10.1	11.1

*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.

MILE END | A1-A3

RESOURCE USE INDICATORS

Table 26. Module A1-A3 Resource use indicators results for 1 m^3 of product produced at Mile End batch plant

		MILE END | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
PERE	MJ	112	79.2	81.8	63.3	123	87.4	90.7	65.8	70.3	142	101	104	75.5	80.6	173	122	126	91.1	97.2	216	152	156	113	120
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	112	79.2	81.8	63.3	123	87.4	90.7	65.8	70.3	142	101	104	75.5	80.6	173	122	126	91.1	97.2	216	152	156	113	120
PENRE	MJ	1,080	870	910	810	1,160	930	980	800	870	1,290	1,020	1,070	870	950	1,500	1,160	1,220	980	1,070	1,780	1,360	1,420	1,120	1,230
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1,080	870	910	810	1,160	930	980	800	870	1,290	1,020	1,070	870	950	1,500	1,160	1,220	980	1,070	1,780	1,360	1,420	1,120	1,230
SM	kg	0.0817	49.2	49.2	105	0.0905	63.2	63.2	125	125	0.105	68.2	68.2	140	140	0.128	72.3	72.3	160	160	0.160	75.3	75.3	186	186
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	0.435	0.364	0.384	0.354	0.456	0.379	0.401	0.337	0.368	0.495	0.407	0.430	0.359	0.392	0.557	0.451	0.475	0.392	0.429	0.642	0.513	0.537	0.439	0.480

WASTE CATEGORIES AND OUTPUT FLOWS

Table 27. Module A1-A3 Waste categories and output flows results for 1 m^3 of product produced at Mile End batch plant

		MILE END | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
HWD	kg	0.00270	0.00241	0.00241	0.00240	0.00295	0.00270	0.00270	0.00269	0.00269	0.00295	0.00261	0.00261	0.00261	0.00261	0.00360	0.00310	0.00310	0.00309	0.00309	0.00451	0.00376	0.00376	0.00375	0.00375
NHWD	kg	6.83	6.67	6.68	6.57	6.90	6.72	6.73	6.60	6.61	7.02	6.81	6.82	6.67	6.68	7.19	6.94	6.95	6.76	6.78	7.38	7.07	7.08	6.85	6.87
RWD	kg	0.0267	0.0189	0.0189	0.0138	0.0295	0.0209	0.0210	0.0152	0.0153	0.0341	0.0241	0.0242	0.0175	0.0176	0.0417	0.0294	0.0294	0.0213	0.0214	0.0520	0.0367	0.0367	0.0266	0.0266
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MILE END | A1-A3

BIOGENIC CARBON INDICATORS

Table 28. Module A1-A3 Biogenic carbon indicators results for 1 m^3 of product produced at Mile End batch plant

		MILE END | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
BCC-prod	kg C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

Table 29. Module A1-A3 Additional environmental impact indicators results for 1 m^3 of product produced at Mile End batch plant

		MILE END | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP-GHG**	kg CO_2-eq	261	191	194	151	287	209	213	160	164	329	238	242	181	186	396	285	290	215	221	488	350	354	261	269
PM	Disease incidences	7.22E-06	5.57E-06	6.15E-06	5.73E-06	7.81E-06	5.98E-06	6.74E-06	5.26E-06	6.27E-06	8.78E-06	6.65E-06	7.47E-06	5.77E-06	6.93E-06	1.04E-05	7.75E-06	8.62E-06	6.58E-06	7.96E-06	1.25E-05	9.27E-06	1.02E-05	7.68E-06	9.35E-06
IRP***	kBq U235 eq.	4.44	3.13	3.14	2.27	4.91	3.47	3.47	2.51	2.51	5.69	4.01	4.01	2.89	2.90	6.95	4.89	4.89	3.52	3.53	8.67	6.10	6.10	4.39	4.40
ETP-fw*	CTUe	398	322	325	279	426	342	346	289	295	473	375	380	314	320	546	427	432	351	360	646	497	502	401	411
HTPc*	CTUh	2.73E-08	1.99E-08	2.02E-08	1.55E-08	3.00E-08	2.18E-08	2.21E-08	1.66E-08	1.70E-08	3.44E-08	2.49E-08	2.52E-08	1.88E-08	1.93E-08	4.14E-08	2.98E-08	3.02E-08	2.23E-08	2.29E-08	5.11E-08	3.66E-08	3.69E-08	2.71E-08	2.78E-08
HTPnc*	CTUh	2.41E-06	1.72E-06	1.74E-06	1.29E-06	2.65E-06	1.90E-06	1.91E-06	1.40E-06	1.42E-06	3.06E-06	2.18E-06	2.20E-06	1.61E-06	1.63E-06	3.71E-06	2.64E-06	2.65E-06	1.93E-06	1.96E-06	4.61E-06	3.26E-06	3.28E-06	2.38E-06	2.41E-06
SQP*	Pt	219	204	203	190	226	208	207	194	192	238	218	217	201	200	252	228	227	207	206	265	235	235	209	209

ENVIRONMENTAL IMPACT INDICATORS | EN15804+A1

Table 30. Module A1-A3 Environmental impact indicators EN15804+A1 for 1 m^3 of product produced at Mile End batch plant

		MILE END | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP	kg CO_2-eq	263	193	195	152	288	210	214	161	166	331	240	244	182	188	398	287	291	216	223	490	352	356	262	270
ODP	kg CFC_{11}-eq.	4.61E-08	4.93E-08	4.82E-08	4.79E-08	4.37E-08	4.63E-08	4.53E-08	4.66E-08	4.50E-08	3.50E-08	3.75E-08	3.66E-08	3.76E-08	3.63E-08	2.43E-08	2.68E-08	2.62E-08	2.68E-08	2.59E-08	2.05E-08	2.36E-08	2.30E-08	2.35E-08	2.26E-08
AP	kg SO_2-eq	0.477	0.366	0.435	0.440	0.517	0.394	0.483	0.370	0.488	0.583	0.440	0.536	0.407	0.542	0.690	0.514	0.616	0.463	0.624	0.836	0.617	0.723	0.538	0.732
EP	kg PO_4^{3-}-eq.	0.0771	0.0610	0.0640	0.0568	0.0829	0.0651	0.0690	0.0558	0.0610	0.0926	0.0719	0.0761	0.0608	0.0668	0.108	0.0827	0.0872	0.0687	0.0759	0.129	0.0976	0.102	0.0794	0.0881
POCP	kg C_2H_4-eq.	0.0195	0.0101	0.0132	0.0105	0.0228	0.0124	0.0164	0.00814	0.0135	0.0283	0.0162	0.0205	0.0110	0.0171	0.0372	0.0224	0.0270	0.0155	0.0228	0.0496	0.0311	0.0359	0.0219	0.0306
ADPE	kg Sb eq.	4.46E-06	3.35E-06	3.44E-06	2.82E-06	4.86E-06	3.63E-06	3.76E-06	2.90E-06	3.06E-06	5.47E-06	4.03E-06	4.17E-06	3.17E-06	3.36E-06	6.53E-06	4.77E-06	4.91E-06	3.70E-06	3.93E-06	8.00E-06	5.80E-06	5.95E-06	4.44E-06	4.72E-06
ADPF	MJ	1,010	820	860	770	1,080	870	920	760	830	1,200	950	1,000	820	900	1,380	1,080	1,140	920	1,010	1,630	1,260	1,320	1,040	1,150

*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

**This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR

***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.

MCLAREN VALE | A1-A3

CORE ENVIRONMENTAL IMPACT INDICATORS | EN15804+A2

Table 31. Module A1-A3 Core environmental impact indicator results for 1 m^3 of product produced at McLaren Vale batch plant

		MCLAREN VALE | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWPt	kg CO_2-eq	273	201	204	159	298	219	223	168	173	342	249	253	190	196	411	298	302	225	232	505	363	368	272	281
GWPf	kg CO_2-eq	270	198	201	157	295	216	220	166	171	338	246	251	188	194	407	294	299	223	229	500	360	364	269	278
GWPb	kg CO_2-eq	2.86	2.37	2.36	2.03	3.05	2.51	2.50	2.15	2.13	3.39	2.77	2.76	2.35	2.33	3.90	3.15	3.13	2.62	2.61	4.50	3.56	3.55	2.91	2.89
GWPluluc	kg CO_2-eq	0.0183	0.0135	0.0142	0.0119	0.0200	0.0147	0.0156	0.0117	0.0130	0.0228	0.0166	0.0177	0.0132	0.0147	0.0274	0.0198	0.0209	0.0155	0.0173	0.0337	0.0242	0.0254	0.0187	0.0208
ODP	kg CFC-11 eq	6.66E-08	7.12E-08	6.96E-08	6.92E-08	6.31E-08	6.69E-08	6.54E-08	6.73E-08	6.50E-08	5.03E-08	5.40E-08	5.28E-08	5.42E-08	5.24E-08	3.47E-08	3.84E-08	3.75E-08	3.84E-08	3.71E-08	2.90E-08	3.36E-08	3.27E-08	3.36E-08	3.21E-08
AP	Mole of H+eq	0.779	0.632	0.712	0.707	0.832	0.669	0.772	0.628	0.766	0.919	0.729	0.841	0.676	0.834	1.06	0.827	0.946	0.749	0.937	1.25	0.963	1.09	0.847	1.08
EPfw	kg P eq	2.15E-04	2.04E-04	2.04E-04	1.97E-04	2.20E-04	2.07E-04	2.08E-04	1.99E-04	2.00E-04	2.27E-04	2.12E-04	2.13E-04	2.02E-04	2.04E-04	2.38E-04	2.20E-04	2.21E-04	2.08E-04	2.10E-04	2.54E-04	2.31E-04	2.32E-04	2.16E-04	2.18E-04
EPm	kg N eq	0.259	0.211	0.220	0.200	0.275	0.223	0.235	0.196	0.212	0.304	0.243	0.256	0.211	0.229	0.349	0.275	0.288	0.234	0.256	0.411	0.318	0.332	0.266	0.291
EPt	Mole of N eq	2.86	2.33	2.43	2.20	3.04	2.46	2.59	2.16	2.33	3.36	2.68	2.82	2.32	2.52	3.86	3.03	3.18	2.58	2.81	4.55	3.51	3.67	2.92	3.21
POCP	kg NMVOC eq	0.691	0.558	0.585	0.528	0.738	0.591	0.626	0.516	0.563	0.817	0.646	0.685	0.557	0.612	0.944	0.735	0.776	0.622	0.687	1.12	0.857	0.899	0.709	0.788
ADPmm*	kg Sb-eq	4.44E-06	3.36E-06	3.46E-06	2.86E-06	4.83E-06	3.64E-06	3.76E-06	2.93E-06	3.10E-06	5.41E-06	4.03E-06	4.16E-06	3.20E-06	3.39E-06	6.44E-06	4.74E-06	4.89E-06	3.71E-06	3.95E-06	7.87E-06	5.74E-06	5.89E-06	4.43E-06	4.71E-06
ADPf*	MJ	1,150	930	970	870	1,230	990	1,040	860	930	1,360	1,080	1,140	940	1,010	1,570	1,230	1,290	1,050	1,140	1,860	1,430	1,490	1,190	1,300
WDP*	m^3 world equiv	12.1	10.3	10.8	10.1	12.6	10.6	11.2	9.55	10.3	13.5	11.3	11.9	10.1	10.9	15.0	12.3	12.9	10.8	11.7	17.2	13.9	14.5	12.0	13.0

*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.

MCLAREN VALE | A1-A3

RESOURCE USE INDICATORS

Table 32. Module A1-A3 Resource use indicators results for 1 m^3 of product produced at McLaren Vale batch plant

		MCLAREN VALE | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
PERE	MJ	114	81.2	83.8	65.1	126	89.4	92.8	67.6	72.1	145	103	107	77.4	82.6	176	125	129	93.2	99.3	219	155	159	115	122
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	114	81.2	83.8	65.1	126	89.4	92.8	67.6	72.1	145	103	107	77.4	82.6	176	125	129	93.2	99.3	219	155	159	115	122
PENRE	MJ	1,150	930	970	870	1,230	990	1,040	860	930	1,360	1,080	1,140	940	1,010	1,570	1,230	1,290	1,050	1,140	1,860	1,430	1,490	1,190	1,300
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1,150	930	970	870	1,230	990	1,040	860	930	1,360	1,080	1,140	940	1,010	1,570	1,230	1,290	1,050	1,140	1,860	1,430	1,490	1,190	1,300
SM	kg	0.0826	49.7	49.7	106	0.0914	63.9	63.9	127	127	0.106	68.9	68.9	142	142	0.130	73.0	73.0	162	162	0.162	76.1	76.1	187	187
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	0.497	0.425	0.445	0.415	0.516	0.438	0.460	0.397	0.428	0.555	0.466	0.489	0.418	0.451	0.615	0.508	0.532	0.449	0.486	0.702	0.571	0.596	0.496	0.538

WASTE CATEGORIES AND OUTPUT FLOWS

Table 33. Module A1-A3 Waste categories and output flows results for 1 m^3 of product produced at McLaren Vale batch plant

		MCLAREN VALE | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
HWD	kg	0.00273	0.00244	0.00244	0.00243	0.00298	0.00272	0.00272	0.00272	0.00272	0.00298	0.00264	0.00264	0.00263	0.00263	0.00364	0.00314	0.00314	0.00313	0.00313	0.00455	0.00380	0.00380	0.00379	0.00379
NHWD	kg	30.9	30.7	30.7	30.6	30.9	30.8	30.8	30.6	30.6	31.1	30.8	30.9	30.7	30.7	31.2	31.0	31.0	30.8	30.8	31.4	31.1	31.1	30.9	30.9
RWD	kg	0.0271	0.0192	0.0193	0.0141	0.0300	0.0213	0.0213	0.0155	0.0156	0.0346	0.0245	0.0245	0.0178	0.0179	0.0422	0.0298	0.0298	0.0217	0.0217	0.0527	0.0371	0.0372	0.0269	0.0270
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MCLAREN VALE | A1-A3

BIOGENIC CARBON INDICATORS

Table 34. Module A1-A3 Biogenic carbon indicators results for 1 m^3 of product produced at McLaren Vale batch plant

		MCLAREN VALE | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
BCC-prod	kg C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

Table 35. Module A1-A3 Additional environmental impact indicators results for 1 m^3 of product produced at McLaren Vale batch plant

		MCLAREN VALE | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP-GHG**	kg CO_2-eq	268	197	200	156	294	215	219	165	170	336	245	249	187	193	404	293	297	221	228	497	358	362	268	276
PM	Disease incidences	9.46E-06	7.79E-06	8.38E-06	7.96E-06	1.01E-05	8.20E-06	8.97E-06	7.47E-06	8.50E-06	1.10E-05	8.88E-06	9.71E-06	7.99E-06	9.16E-06	1.26E-05	9.99E-06	1.09E-05	8.81E-06	1.02E-05	1.48E-05	1.15E-05	1.24E-05	9.92E-06	1.16E-05
IRP***	kBq U235 eq.	4.51	3.18	3.19	2.31	4.98	3.52	3.52	2.55	2.55	5.76	4.06	4.07	2.94	2.94	7.03	4.95	4.95	3.57	3.58	8.78	6.17	6.18	4.45	4.46
ETP-fw*	CTUe	419	342	345	299	448	363	367	310	316	497	398	403	336	343	573	452	458	376	384	674	523	528	426	437
HTPc*	CTUh	2.82E-08	2.08E-08	2.10E-08	1.63E-08	3.09E-08	2.27E-08	2.30E-08	1.74E-08	1.78E-08	3.54E-08	2.58E-08	2.62E-08	1.97E-08	2.01E-08	4.25E-08	3.08E-08	3.12E-08	2.32E-08	2.38E-08	5.23E-08	3.77E-08	3.80E-08	2.81E-08	2.88E-08
HTPnc*	CTUh	2.49E-06	1.80E-06	1.81E-06	1.37E-06	2.74E-06	1.98E-06	1.99E-06	1.48E-06	1.50E-06	3.15E-06	2.26E-06	2.28E-06	1.68E-06	1.71E-06	3.81E-06	2.73E-06	2.74E-06	2.01E-06	2.04E-06	4.72E-06	3.36E-06	3.38E-06	2.47E-06	2.50E-06
SQP*	Pt	278	263	262	248	284	265	265	251	250	296	274	274	258	257	307	282	282	261	261	321	290	290	264	264

ENVIRONMENTAL IMPACT INDICATORS | EN15804+A1

Table 36. Module A1-A3 Environmental impact indicators EN15804+A1 for 1 m^3 of product produced at McLaren Vale batch plant

		MCLAREN VALE | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP	kg CO_2-eq	270	199	201	157	295	217	220	167	171	338	247	251	188	194	407	295	299	223	230	500	360	364	269	278
ODP	kg CFC_{11}-eq.	4.64E-08	4.96E-08	4.85E-08	4.82E-08	4.40E-08	4.66E-08	4.56E-08	4.69E-08	4.53E-08	3.51E-08	3.76E-08	3.68E-08	3.78E-08	3.65E-08	2.44E-08	2.69E-08	2.62E-08	2.69E-08	2.59E-08	2.05E-08	2.36E-08	2.30E-08	2.36E-08	2.26E-08
AP	kg SO_2-eq	0.586	0.473	0.543	0.548	0.626	0.502	0.592	0.478	0.597	0.693	0.548	0.645	0.515	0.652	0.801	0.624	0.727	0.572	0.735	0.949	0.728	0.835	0.648	0.845
EP	kg PO_4^{3-}-eq.	0.0902	0.0739	0.0770	0.0697	0.0961	0.0780	0.0820	0.0686	0.0739	0.106	0.0849	0.0892	0.0738	0.0798	0.122	0.0959	0.100	0.0818	0.0890	0.143	0.111	0.116	0.0926	0.101
POCP	kg C_2H_4-eq.	0.0249	0.0154	0.0185	0.0158	0.0282	0.0177	0.0217	0.0133	0.0187	0.0336	0.0213	0.0257	0.0161	0.0222	0.0425	0.0275	0.0321	0.0206	0.0279	0.0550	0.0363	0.0411	0.0270	0.0358
ADPE	kg Sb eq.	4.61E-06	3.48E-06	3.58E-06	2.95E-06	5.02E-06	3.77E-06	3.90E-06	3.03E-06	3.20E-06	5.63E-06	4.18E-06	4.32E-06	3.31E-06	3.50E-06	6.71E-06	4.93E-06	5.08E-06	3.85E-06	4.08E-06	8.20E-06	5.98E-06	6.13E-06	4.60E-06	4.88E-06
ADPF	MJ	1,070	880	910	830	1,140	930	980	820	890	1,260	1,010	1,070	880	960	1,450	1,150	1,210	990	1,080	1,710	1,330	1,390	1,110	1,220

*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

**This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR

***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.

OSBORNE | A1-A3

CORE ENVIRONMENTAL IMPACT INDICATORS | EN15804+A2

Table 37. Module A1-A3 Core environmental impact indicator results for 1 m^3 of product produced at Osborne batch plant

		OSBORNE | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWPt	kg CO_2-eq	278	207	209	165	303	224	228	174	179	346	254	258	196	201	414	302	306	230	236	507	367	371	276	285
GWPf	kg CO_2-eq	275	204	207	163	300	221	225	172	177	342	251	255	193	199	409	298	302	227	233	502	363	367	273	281
GWPb	kg CO_2-eq	3.28	2.80	2.79	2.46	3.46	2.93	2.92	2.57	2.55	3.78	3.17	3.16	2.75	2.73	4.26	3.51	3.50	2.99	2.98	4.86	3.93	3.92	3.28	3.26
GWPluluc	kg CO_2-eq	0.0209	0.0161	0.0169	0.0146	0.0226	0.0173	0.0183	0.0144	0.0157	0.0254	0.0193	0.0203	0.0159	0.0173	0.0299	0.0224	0.0235	0.0181	0.0199	0.0362	0.0268	0.0279	0.0213	0.0234
ODP	kg CFC-11 eq	6.57E-08	7.03E-08	6.87E-08	6.83E-08	6.22E-08	6.60E-08	6.46E-08	6.64E-08	6.42E-08	4.95E-08	5.32E-08	5.20E-08	5.34E-08	5.16E-08	3.40E-08	3.77E-08	3.68E-08	3.77E-08	3.64E-08	2.84E-08	3.29E-08	3.21E-08	3.29E-08	3.15E-08
AP	Mole of H+eq	0.720	0.573	0.653	0.648	0.771	0.609	0.712	0.569	0.706	0.857	0.669	0.780	0.616	0.773	0.995	0.765	0.883	0.687	0.874	1.19	0.899	1.02	0.785	1.01
EPfw	kg P eq	2.17E-04	2.05E-04	2.06E-04	1.99E-04	2.21E-04	2.08E-04	2.09E-04	2.00E-04	2.02E-04	2.28E-04	2.13E-04	2.14E-04	2.04E-04	2.05E-04	2.40E-04	2.21E-04	2.22E-04	2.10E-04	2.12E-04	2.55E-04	2.32E-04	2.33E-04	2.17E-04	2.20E-04
EPm	kg N eq	0.252	0.205	0.214	0.193	0.268	0.216	0.228	0.190	0.205	0.296	0.236	0.248	0.204	0.222	0.341	0.267	0.280	0.227	0.248	0.402	0.310	0.324	0.258	0.283
EPt	Mole of N eq	2.78	2.26	2.36	2.13	2.97	2.39	2.52	2.09	2.26	3.27	2.60	2.74	2.25	2.44	3.77	2.95	3.09	2.49	2.73	4.45	3.42	3.58	2.84	3.12
POCP	kg NMVOC eq	0.660	0.528	0.555	0.499	0.706	0.560	0.596	0.486	0.533	0.784	0.614	0.653	0.526	0.580	0.909	0.701	0.742	0.589	0.653	1.08	0.822	0.865	0.676	0.754
ADPmm*	kg Sb-eq	4.57E-06	3.50E-06	3.60E-06	3.00E-06	4.95E-06	3.77E-06	3.89E-06	3.07E-06	3.23E-06	5.52E-06	4.15E-06	4.28E-06	3.32E-06	3.51E-06	6.53E-06	4.85E-06	4.99E-06	3.82E-06	4.05E-06	7.94E-06	5.84E-06	5.99E-06	4.54E-06	4.82E-06
ADPf*	MJ	1,240	1,020	1,060	970	1,310	1,080	1,130	950	1,020	1,440	1,170	1,220	1,020	1,100	1,650	1,310	1,370	1,120	1,210	1,930	1,510	1,570	1,260	1,380
WDP*	m^3 world equiv	12.0	10.2	10.7	9.97	12.5	10.5	11.1	9.46	10.2	13.4	11.2	11.8	9.96	10.8	14.9	12.2	12.8	10.7	11.6	17.0	13.8	14.4	11.9	12.9

*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.

OSBORNE | A1-A3

RESOURCE USE INDICATORS

Table 38. Module A1-A3 Resource use indicators results for 1 m^3 of product produced at Osborne batch plant

		OSBORNE | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
PERE	MJ	113	80.7	83.3	64.8	125	88.9	92.2	67.3	71.7	144	102	106	77.0	82.1	175	124	128	92.6	98.7	217	154	158	114	121
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	113	80.7	83.3	64.8	125	88.9	92.2	67.3	71.7	144	102	106	77.0	82.1	175	124	128	92.6	98.7	217	154	158	114	121
PENRE	MJ	1,240	1,020	1,060	970	1,310	1,080	1,130	950	1,020	1,440	1,170	1,220	1,020	1,100	1,650	1,310	1,370	1,120	1,210	1,930	1,510	1,570	1,270	1,380
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1,240	1,020	1,060	970	1,310	1,080	1,130	950	1,020	1,440	1,170	1,220	1,020	1,100	1,650	1,310	1,370	1,120	1,210	1,930	1,510	1,570	1,270	1,380
SM	kg	0.0819	49.3	49.3	106	0.0907	63.4	63.4	126	126	0.105	68.4	68.4	141	141	0.129	72.4	72.4	161	161	0.161	75.5	75.5	186	186
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	0.493	0.422	0.441	0.412	0.512	0.435	0.457	0.394	0.424	0.551	0.462	0.485	0.415	0.448	0.610	0.504	0.528	0.445	0.482	0.696	0.567	0.591	0.492	0.533

WASTE CATEGORIES AND OUTPUT FLOWS

Table 39. Module A1-A3 Waste categories and output flows results for 1 m^3 of product produced at Osborne batch plant

		OSBORNE | A1 - A3																							
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
HWD	kg	0.00271	0.00242	0.00242	0.00241	0.00296	0.00270	0.00270	0.00270	0.00270	0.00296	0.00262	0.00262	0.00261	0.00261	0.00361	0.00311	0.00311	0.00310	0.00310	0.00452	0.00377	0.00377	0.00376	0.00376
NHWD	kg	1.32	1.16	1.16	1.06	1.38	1.20	1.21	1.08	1.09	1.50	1.29	1.30	1.15	1.17	1.67	1.42	1.43	1.25	1.26	1.87	1.55	1.56	1.34	1.36
RWD	kg	0.0269	0.0191	0.0191	0.0139	0.0297	0.0211	0.0211	0.0154	0.0154	0.0343	0.0243	0.0243	0.0177	0.0177	0.0418	0.0296	0.0296	0.0215	0.0215	0.0522	0.0368	0.0369	0.0267	0.0268
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

OSBORNE | A1-A3

BIOGENIC CARBON INDICATORS

Table 40. Module A1-A3 Biogenic carbon indicators results for 1 m^3 of product produced at Osborne batch plant

		OSBORNE | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
BCC-prod	kg C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

Table 41. Module A1-A3 Additional environmental impact indicators results for 1 m^3 of product produced at Osborne batch plant

		OSBORNE | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP-GHG**	kg CO_2-eq	273	203	206	162	298	220	224	171	176	340	250	254	192	198	407	296	301	225	232	499	361	365	272	280
PM	Disease incidences	8.07E-06	6.41E-06	7.00E-06	6.58E-06	8.65E-06	6.82E-06	7.58E-06	6.09E-06	7.11E-06	9.62E-06	7.49E-06	8.31E-06	6.60E-06	7.77E-06	1.12E-05	8.58E-06	9.45E-06	7.40E-06	8.79E-06	1.34E-05	1.01E-05	1.10E-05	8.51E-06	1.02E-05
IRP***	kBq U235 eq.	4.47	3.16	3.16	2.29	4.94	3.49	3.49	2.52	2.53	5.72	4.03	4.03	2.91	2.92	6.97	4.91	4.91	3.54	3.55	8.71	6.12	6.13	4.41	4.42
ETP-fw*	CTUe	464	388	392	345	491	407	412	355	360	538	440	445	378	385	611	491	496	414	423	711	561	566	465	475
HTPc*	CTUh	2.85E-08	2.11E-08	2.13E-08	1.66E-08	3.11E-08	2.29E-08	2.32E-08	1.76E-08	1.81E-08	3.55E-08	2.60E-08	2.63E-08	1.99E-08	2.03E-08	4.25E-08	3.09E-08	3.13E-08	2.34E-08	2.40E-08	5.22E-08	3.77E-08	3.81E-08	2.82E-08	2.89E-08
HTPnc*	CTUh	2.46E-06	1.77E-06	1.78E-06	1.34E-06	2.70E-06	1.94E-06	1.96E-06	1.45E-06	1.47E-06	3.11E-06	2.23E-06	2.24E-06	1.65E-06	1.67E-06	3.76E-06	2.68E-06	2.70E-06	1.98E-06	2.00E-06	4.66E-06	3.31E-06	3.33E-06	2.42E-06	2.46E-06
SQP*	Pt	300	285	284	270	306	287	287	273	272	317	296	296	280	279	329	304	304	283	283	342	312	312	286	286

ENVIRONMENTAL IMPACT INDICATORS | EN15804+A1

Table 42. Module A1-A3 Environmental impact indicators EN15804+A1 for 1 m^3 of product produced at Osborne batch plant

		OSBORNE | A1 - A3																								
	MIX NAME	N2020P				N2520P					N3220P					N4020P					N5020P				
PARAMETER	UNIT	Ref	F30	S30	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50	Ref	F30	S30	T50	S50
GWP	kg CO_2-eq	275	204	207	163	300	222	226	172	177	342	252	255	194	199	410	298	303	227	234	502	363	368	274	282
ODP	kg CFC_{11}-eq.	4.58E-08	4.89E-08	4.78E-08	4.76E-08	4.34E-08	4.60E-08	4.50E-08	4.62E-08	4.47E-08	3.46E-08	3.71E-08	3.63E-08	3.72E-08	3.60E-08	2.39E-08	2.64E-08	2.58E-08	2.64E-08	2.55E-08	2.01E-08	2.32E-08	2.25E-08	2.31E-08	2.22E-08
AP	kg SO_2-eq	0.535	0.424	0.493	0.498	0.575	0.451	0.540	0.427	0.546	0.641	0.497	0.593	0.464	0.600	0.747	0.571	0.673	0.520	0.681	0.894	0.674	0.780	0.595	0.790
EP	kg PO_4^{3-}-eq.	0.0880	0.0718	0.0748	0.0676	0.0937	0.0758	0.0797	0.0665	0.0717	0.103	0.0825	0.0868	0.0715	0.0775	0.119	0.0933	0.0978	0.0793	0.0864	0.140	0.108	0.113	0.0900	0.0987
POCP	kg C_2H_4-eq.	0.0141	0.00471	0.00784	0.00516	0.0175	0.00706	0.0111	0.00275	0.00811	0.0230	0.0108	0.0152	0.00560	0.0117	0.0319	0.0171	0.0217	0.0102	0.0175	0.0444	0.0258	0.0306	0.0166	0.0254
ADPE	kg Sb eq.	4.74E-06	3.62E-06	3.72E-06	3.09E-06	5.13E-06	3.90E-06	4.02E-06	3.16E-06	3.33E-06	5.74E-06	4.30E-06	4.43E-06	3.44E-06	3.63E-06	6.79E-06	5.03E-06	5.18E-06	3.96E-06	4.19E-06	8.27E-06	6.07E-06	6.22E-06	4.71E-06	4.98E-06
ADPF	MJ	1,160	970	1,010	930	1,230	1,020	1,070	910	980	1,340	1,100	1,150	970	1,040	1,530	1,220	1,280	1,060	1,150	1,780	1,400	1,460	1,190	1,300

*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

**This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR

***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.

RESULTS | C1-C4 + D

Modules C1-C4 and D are only sensitive to mass. The density of products ranges from 2,293 kg/m^3 (N2020P S50) to 2,367 kg/m^3 (N5020P Ref). This means maximum difference among the results would be 3%. For this reason, only results for one of the mixes (N3220P S50) with the closest density (2,332 kg/m^3) to average density (2,330 kg/m^3) is provided here.

CORE ENVIRONMENTAL IMPACT INDICATORS | EN15804+A2

Table 43. Module C1-C4 + D Core environmental impact indicator results for 1 m^3 of product

	MIX NAME	N3220P S50 - representative for average density				
PARAMETER	UNIT	C1	C2	C3	C4	D
GWPt	kg CO_2-eq	14.8	5.96	5.08	8.00	-11.7
GWPf	kg CO_2-eq	14.8	5.70	5.05	7.99	-11.6
GWPb	kg CO_2-eq	0.0102	0.256	0.0123	-0.00177	-0.0499
GWPluc	kg CO_2-eq	1.62E-04	6.39E-05	0.0154	0.0116	-0.0286
ODP	kg CFC-11 eq	1.51E-12	5.96E-13	1.37E-11	1.49E-11	-9.40E-11
AP	Mole of H+eq	0.0210	0.0115	0.0249	0.0472	-0.0323
EPfw	kg P eq	2.47E-06	9.77E-07	1.16E-05	1.09E-05	-3.36E-05
EPm	kg N eq	0.00723	0.00495	0.0116	0.0124	-0.0107
EPt	Mole of N eq	0.0793	0.0545	0.128	0.136	-0.124
POFP	kg NMVOC eq	0.0217	0.0112	0.0313	0.0376	-0.0273
ADPmm*	kg Sb-eq	2.70E-07	1.07E-07	5.73E-06	6.74E-07	-2.21E-06
ADPf*	MJ	200	80	100	110	-190
WDP*	m^3 world equiv	0.0949	0.0376	0.858	0.698	-5.53

*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.

RESOURCE USE INDICATORS

Table 44. Module C1-C4 + D Resource use indicators results for 1 m^3 of product

	MIX NAME	N3220P S50 - representative for average density				
PARAMETER	UNIT	C1	C2	C3	C4	D
PERE	MJ	0.973	0.385	9.37	12.4	-68.2
PERM	MJ	0	0	0	0	0
PERT	MJ	0.973	0.385	9.37	12.4	-68.2
PENRE	MJ	200	80	100	110	-190
PENRM	MJ	0	0	0	0	0
PENRT	MJ	200	80	100	110	-190
SM	kg	0	0	0	0	0
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	0.00190	7.50E-04	0.0248	0.0211	-0.160

WASTE CATEGORIES AND OUTPUT FLOWS

Table 45. Module C1-C4 + D Waste categories and output flows results for 1 m^3 of product

	MIX NAME	N3220P S50 - representative for average density				
PARAMETER	UNIT	C1	C2	C3	C4	D
HWD	kg	3.23E-10	1.28E-10	1.29E-09	4.26E-09	-1.10E-08
NHWD	kg	0.00483	0.00191	0.0286	420	-0.102
RWD	kg	3.89E-05	1.54E-05	7.37E-04	9.19E-04	-0.0186
CRU	kg	0	0	0	0	0
MFR	kg	0	0	1,910	0	0
MER	kg	0	0	0	0	0
EEE	MJ	0	0	0	0	0
EET	MJ	0	0	0	0	0

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

Table 46. Module C1-C4 + D Additional environmental impact indicators results for 1 m^3 of product

	MIX NAME	N3220P S50 - representative for average density				
PARAMETER	UNIT	C1	C2	C3	C4	D
GWP-GHG**	kg CO_2-eq	14.7	5.65	4.99	7.89	-11.5
PM	Disease incidences	2.08E-07	8.11E-08	4.81E-07	5.75E-07	-1.13E-06
IRP***	kBq U235 eq.	0.00505	0.00200	0.0728	0.102	-3.15
ETP-fw*	CTUe	79.8	31.6	72.2	55.3	-98.1
HTPc*	CTUh	1.35E-09	5.33E-10	1.55E-09	7.17E-09	-2.85E-09
HTPnc*	CTUh	4.44E-08	1.99E-08	8.08E-08	7.82E-07	-1.71E-07
SQP*	Pt	0.561	0.222	21.2	17.1	-64.4

ENVIRONMENTAL IMPACT INDICATORS | EN15804+A1

Table 47. Module C1-C4 + D Environmental impact indicators EN15804+A1 for 1 m^3 of product

	MIX NAME	N3220P S50 - representative for average density				
PARAMETER	UNIT	C1	C2	C3	C4	D
GWP	kg CO_2-eq	14.7	5.88	4.93	7.84	-11.4
ODP	kg CFC_{11}-eq.	1.77E-12	7.02E-13	1.61E-11	1.75E-11	-1.11E-10
AP	kg SO_2-eq	0.0159	0.00826	0.0173	0.0375	-0.0237
EP	kg PO_4^{3-}-eq.	0.00246	0.00168	0.00405	0.00430	-0.00440
POCP	kg C_2H_4-eq.	0.00166	-0.00161	0.00196	0.00299	-2.81E-04
ADPE	kg Sb eq.	2.71E-07	1.07E-07	5.73E-06	6.79E-07	-2.33E-06
ADPF	MJ	200	80	90	100	-140

*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

**This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR

***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.

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PROGRAMME-RELATED INFORMATION AND VERIFICATION

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PCR		PCR 2019:14 Construction Products, version 1.11, 2021-02-05 (valid until 2024-12-20) c-PCR-003: Product Category Rules (PCR) for Concrete and Concrete Elements (EN 16757) 2019-12-20 (valid until 2024-12-20)
PCR review conducted by:		The Technical Committee of the International EPD® System Claudia A. Peña, University of Concepción, Chile info@environdec.com
Independent verification of the declaration and data, according to ISO 14025:	☐	EPD process certification (Internal)
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Procedure for follow-up of data during EPD validity involved third-party verifier	☐	yes
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An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules).

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