

ENVIRONMENTAL PRODUCT DECLARATION

READY MIXED CONCRETE USING
HOLCIM SUPPLIED CEMENT

IN ACCORDANCE WITH ISO 14025 AND EN 15804

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INTRODUCTION



COMPANY PROFILE

Allied Concrete have over 50 concrete plants throughout the country as well as several mobile plants. With over 400 trucks in their modern fleet and more than 500 staff, Allied Concrete continually apply new technology to ensure they have state-of-the-art technical equipment to create products and transport them to customers.

Allied Concrete is regarded as a technical leader in New Zealand, through award winning technical and operational expertise, high quality and innovative concrete solutions, strict quality standards and capacity to supply large volumes of concrete.

WHAT IS AN EPD

An Environmental Product Declaration (EPD) is an independently verified and registered document that communicates transparent and comparable data and other relevant environmental information about the life-cycle environmental impact of a product. EPD's allow manufacturers to report quantified environmental performance information for their products.

All EPDs registered with EPD Australasia Limited are publicly available and mutually recognised within the International EPD® System, ensuring global alignment and broad market visibility.

This EPD has been prepared in accordance with ISO 14025: 2006, EN 15804: 2013, EN 16757: 2017 (CEN, 2017), and PCR 2012:01 (International EPD® System; 2018). In addition it meets the requirements of The International EPD® System (2015) and EPD Australasia (2017). It covers pump and standard grades of Normal ready mixed concrete at compressive strengths between 17.5 MPa, 50 MPa, and special ready mixed concrete at 50 MPa, produced in accordance with NZS 3104: 2003 at batching plants illustrated on the map on page 4.

Allied Concrete has sole ownership, liability and responsibility for this EPD.



RESULTS PRESENTED IN THIS EPD:

- Have a cradle to gate system boundary (see the LCA Calculation section) because other stages are very dependent on particular scenarios and are better developed for specific building or construction works.
- EPD of construction products may not be comparable if they do not comply with the requirements of comparability set in EN 15804: 2013. EPDs within the same product category but from different programmes may not be comparable.
- Are averages by compressive strength, weighted by volumes produced at batching plants covered by this EPD during the twelve months of 2017.
- Are representative of Allied Concrete batching plants wholly supplied in 2017 by Holcim (New Zealand) Ltd cement.
- Are not representative of ready mixed concrete from any other Allied Concrete batching plants.

GREEN STAR COMPLIANCE

Because this EPD is product-specific and meets the following criteria is it is recognised by Green Star (New Zealand).

- Cradle to gate system
- Is EN15804-compliant
- Third party-verified



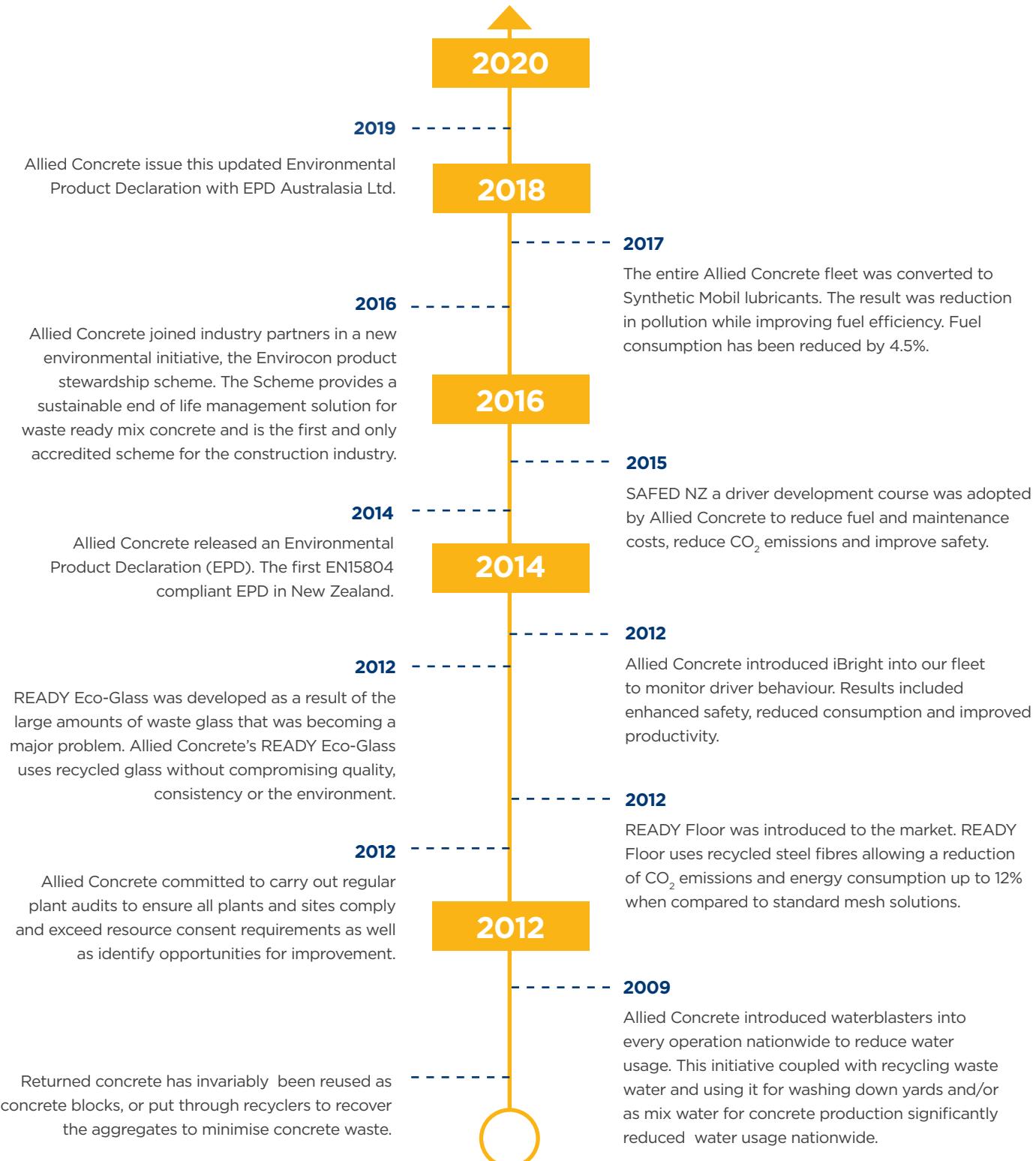
BATCHING PLANTS INCLUDED IN EPD



SUSTAINABILITY

The company's view is that sustainability is all about meeting the needs of today, without adversely impacting on the needs of tomorrow. Allied Concrete apply this philosophy across a wide range of areas that influence business such as the environment, society and the economy.

We are mindful that the work we do could have a negative impact on the environment if we do not operate in an efficient manner. To this end we continue to monitor sites and carry out regular audits to ensure all sites are compliant and are meeting all resource consent conditions. Allied Concrete aim to minimise the use of resources and energy, every day through the following initiatives:



HEALTH AND SAFETY

It is important to take all necessary safety precautions when dealing with ready-mixed concrete due to its alkaline composition.

The caustic nature of fresh concrete can cause contact dermatitis, an inflammatory skin condition caused by certain irritants contained in many industrial materials. The cement in concrete physically damages the skin (the damage is characterized by red, itchy skin that can become blistered and weepy).

The dermatitis reaction of the skin will vary from one person to another; the reaction may be only a mild redness in less severe cases, but this can develop into swelling, blisters and septic ulcers that are both unsightly and painful.

The use of protective clothing is recommended and where it is provided (such as overalls and gloves), it must be of the right type to protect the wearer against the absorption of alkaline moisture from the concrete (protective clothing which remains damp and in skin contact can severely exacerbate dermatitis symptoms). Allied Concrete offers advice on the most suitable gloves for specific types of hazard. Note that when using gloves to help prevent dermatitis, users must avoid getting contaminants inside the gloves when putting them on and taking them off. It is

also important to provide washing facilities, with a supply of hot and cold (or warm) running water, soap and a means of drying the hands, to help prevent dermatitis.

As a secondary precaution the use of barrier creams will also assist in the mitigation of any dermatitis risk beyond the protection offered by the safety clothing.

HAZARDOUS SUBSTANCES AND NEW ORGANISMS ACT HSNO DECLARATION.

The concretes manufactured under this EPD are made with cement which is classified as hazardous according to the criteria HS (Minimum Degrees of Hazard) Regulations 2001.

The HSNO Group Standard is: Construction Products (Corrosive 8.2C) Group Standard.

Hazard Classification: 6.1D; 6.5A; 6.5B; 8.2C; 8.3A.

Environmental hazards associated with the use of these concretes is covered in the NZRMCA publications “On site Management of Concrete Washwater” and “Ready-mixed Concrete Driver Responsibilities for the On Site Management of Concrete Washwater” which can be downloaded from the NZRMCA website (www.nzrmca.org.nz).



OUR PRODUCTS



OUR PRODUCT

PRODUCT DESCRIPTION

Ready mixed concrete is produced at batching plants where controlled operations allow precise mix designs resulting in a product that is delivered to construction sites in a freshly mixed, plastic or unhardened state. Concretes categorised as Normal and Special are defined and made in accordance with NZS 3104:2003, to ensure that nominal strengths are achieved. This Standard defines the production and testing regime necessary to achieve the target strengths for concretes from 17.5 to 50 MPa.

Concretes covered by this EPD are constituted from cement, coarse and fine aggregates, secondary materials, recycled or fresh water and admixtures, proportioned to exceed the target strength for the respective strength classes for this EPD.

The weighted average composition by mass of ready mixed concretes in this EPD are as follows:

Cement (Holcim supplied):	12%
Coarse and fine aggregates:	81%
Secondary materials:	<0.1%
Water (fresh or recycled):	7%
Admixtures:	<0.1%

All concretes are truck mixed prior to dispatch from batching plants with the exception of concretes produced from Avondale, East Tamaki, Dunedin, Mosgiel, and Wanganui where central mixers (tilting drum, pan or twin shaft) are used.

The materials used in the concretes covered by this EPD are as follows:

- Cement: Cement is imported by Holcim from a Mitsubishi Materials Corporation (MMC) cement plant in Japan. Cement production follows a two stage process. In the first stage, raw materials (primarily limestone, silica sand and fly ash) are heated to

produce clinker. In the second stage, the clinker, together with limestone, gypsum, slag and grinding aids are ground to produce cement (under Holcim's brand name Ultracem). Ultracem is transported via ship to Holcim's two import terminals in Auckland and Timaru, from there it is transported via distribution depots to the batching plants covered by this EPD.

- Aggregates: These are a variety of materials that can be broadly classified as either manufactured, or naturally derived (alluvial). Coarse and fine aggregates meet the production requirements of NZS 3121:1986. Demolition-based aggregates are not used in concretes covered by this EPD.
- Natural pozzolans: Where incorporated in mixes, this is micro-silica.
- Secondary materials: Where incorporated in mixes, they consist of fly ash (a byproduct of coal combustion) and silica fume (a byproduct of the metals industry).
- Water: May be fresh (from a reticulated network or bore) or recycled, depending on the mix design.
- Admixtures: These meet either NZS 3113: 1979 or AS 1478:2005 and are used to improve fresh concrete properties (slump retention, workability, early strength).

PROPERTIES

Typical physical properties of the concretes covered by this EPD are shown in Table 1.

Properties of the concretes are defined in NZS 3109: 1997 for workability, and NZS 3104: 2003 which requires that not more than 5% of all concretes produced fall below the nominal strength.

Minimum levels of cover required for different exposure classes to achieve expected service lifetimes of 50 and 100 years are set out in NZS 3101:2006. Table 1 provides examples for A1 and B2 exposure classes.

TABLE 1. PHYSICAL PROPERTIES OF CONCRETES COVERED BY THIS EPD

TECHNICAL DATA	NOMINAL COMPRESSIVE STRENGTH									UNIT	TEST METHOD
	17.5	20	25	30	35	40	45	50	50 Special		
Target Strength	22.0	24.5	30.5	36.0	42.0	47.5	53.0	58.0	58.0	MPa	NZS 3112
Density*	2340	2350	2360	2410	2420	2420	2430	2430	2430	kg/m ³	NZS 3112
Thermal Conductivity	1-1.8	1-1.8	1-1.8	1-1.8	1-1.8	1-1.8	1-1.8	1-1.8	1-1.8	kW/(m.K)	ASTM C518
Tensile Strength	2.0	2.5	2.5	2.8	3.6	3.8	4.2	4.6	4.6	MPa	NZS 3112
Modulus of Elasticity (Young's modulus)	-	25	26	28	-	31	-	34	34	GPa	ASTM C469
Typical Shrinkage**	650	-	-	-	710	-	-	730	730	µS	AS 1012.13
Minimum cover (50 / 100 year life)	Exposure Class A1	-/-	25/-	25/35	20/30	20/30	20/30	20/30	20/30	mm	Table 3.6 & 3.7 NZS 3101
	Exposure Class B2	-/-	-/-	-/-	45/65	40/55	35/50	30/45	30/40	mm	Table 3.6 & 3.7 NZS 3101
	Exposure Class C	-/-	-/-	-/-	-/-	-/-	-/-	-/-	60/60	mm	Table 3.6 & 3.7 NZS 3101

Note: the aggregates used in concretes covered by the EPD use a variety of aggregate types. For simplicity reasons we have used technical data from two geological sources, viz. *greywacke and **basalt.

FIRE RESISTANCE OF CONCRETE

Concrete has good fire resistance properties in use. This performance is due to concrete's constituent materials (cement and aggregates) which, when chemically combined within concrete, form a material that is essentially inert and, most importantly, has relatively poor thermal conductivity.

This property (a slow rate of conductivity (heat transfer)) enables concrete to act as a combustion and heat shield between adjacent spaces.

This same property also protects concrete from damage during a fire, with extended times whereby the structure can be subjected to high temperatures yet still perform structurally without the risk of sudden collapse.

ACOUSTIC PERFORMANCE OF CONCRETE

The acoustic performance of concrete is determined by its ability to attenuate sound energy, which is directly linked to its mass. Good sound insulation by walls and floors is achieved using the inherent mass and damping qualities of concrete.

APPLICATION

The ready-mixed concrete covered by this EPD can be used in all structures and building elements that comprise the built environment, from residential and light commercial applications to commercial high rise and infrastructural uses, including landscaping applications.

QUALITY CONTROL

Concretes are sampled and tested to ensure compliance with NZS 3104:2003 and NZS 3109:1997.

Plant Engineers certify on a three monthly basis that all testing is being carried out as required, and plants are audited by the concretenz Plant Audit Committee under Plant Audit Scheme for audit of concrete production plants.

PRODUCT LIFECYCLE ASSESSMENT

DECLARED UNIT

The declared unit is 1m³ of pump and standard grades of Normal ready mixed concrete at 17.5 MPa, 20 MPa, 25 MPa, 30 MPa, 35 MPa, 40 MPa, 45 MPa, 50 MPa and Special ready mixed concrete at 50 MPa compressive strengths, produced with cement supplied by Holcim (New Zealand) Ltd.

From NZS 3104:2003, compressive strength is normally at age 28 days unless stated otherwise, which classifies a concrete for purposes of design and construction.

The level of compressive strength is required to be equalled or exceeded by 95% of the concrete produced.

SYSTEM BOUNDARY

This is a cradle to gate EPD comprising processes in Figure 1. In this study, the system boundary includes raw material acquisition (A1), transport to batching plants (A2) and batching plants operation (A3).

The MMC cement plant acquires limestone and silica sand from a nearby quarry, while all other raw materials are either trucked or shipped in.

The cement plant operates a “dry process” wherein raw materials are dried and milled together then fed into the

upper end of a rotary kiln. The lower end of the kiln is heated using a variety of fuels, primarily coal but also a range of alternative recycled fuel sources; including wood chips, plastics, fluids, tyres, garbage and oils. The dry meal is heated as it slowly moves down the kiln until it reaches a temperature of almost 1500°C producing “clinker”.

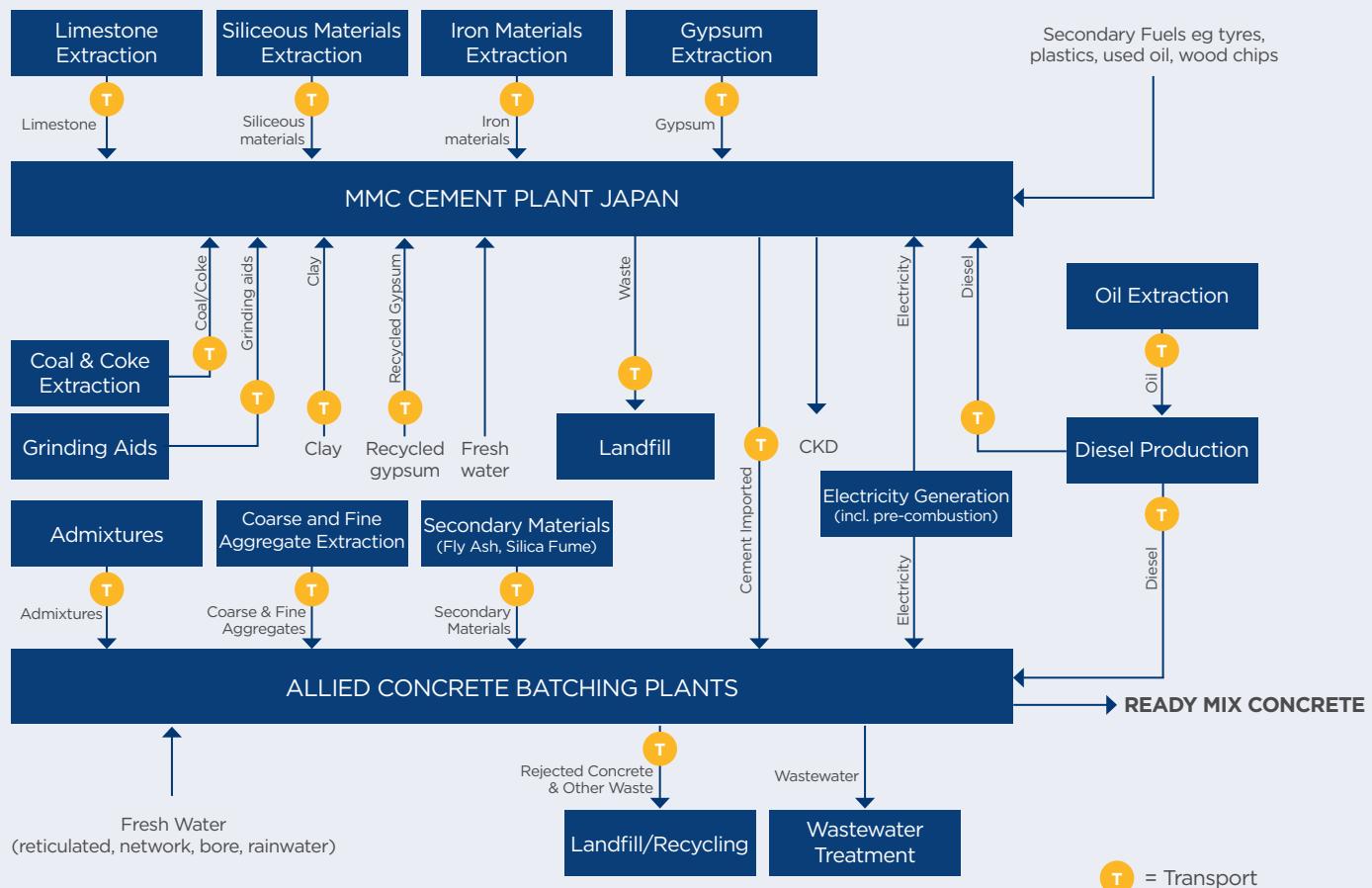
This temperature completely changes the raw materials into new minerals which will react with water to form a cementitious binder. The clinker is subsequently ground with gypsum, slag, limestone and grinding aids, to produce cement (Ultracem) which is shipped to New Zealand and then transported via a distribution network to concrete batching plants.

The MMC plant generates the majority of their own electricity requirements and only a small portion is purchased from the Japan Grid.

In addition to cement, other feedstocks for ready mixed concrete production are fine and coarse aggregates, secondary materials, water and admixture. More information about these can be found in the Product Description section of the EPD. Batching plants primarily use electricity, but also some diesel for loaders and mixing of concrete. Concretes not meeting quality requirements are landfilled.



FIGURE 1 - PROCESS FLOW DIAGRAM



KEY ASSUMPTIONS AND ESTIMATES

The following have been assumed or estimated for this study.

- Electricity, diesel use by loaders, water used in manufacturing and general waste produced at batching plants is the same per m³ of ready mixed concrete, irrespective of compressive strength or whether Normal or Special.
- Out of 44 batching plants, 12 have no metered water intake. An average freshwater input per m³ ready mixed concrete was calculated for sites that are metered, which was applied to unmetered sites according to their production.
- Rainfall on process-related hardstanding areas of batching plants drains to storage ponds where the water is no longer fresh. This captured rainwater is considered as used in the process of manufacturing concrete.
- Wastewater discharges from kitchens and bathrooms at batching plants are based on a per person, per day rate measured at one batching plant. On occasion, excess water from storage ponds was moved by truck mixers to other storage locations or landfill to avoid potential overflow. This is considered as wastewater.

CUT OFF CRITERIA

All raw materials and energy required to make cement and ready mixed concrete are included based on process data from Holcim (for clinker and cement) and Allied Concrete (for ready mixed concrete). Exclusions are:

- Use of carbon dioxide to reduce alkalinity of wastewater discharges, which occurs at the Wellington batching plant only.

These have been tested and found to make a negligible contribution to reported indicators and are therefore excluded.

ALLOCATION

Allied Concrete produces Special as well as Normal ready mixed concretes at its batching plants. Where site total data has been obtained (e.g. for electricity use), this has been allocated based on the volume of total ready mixed concrete production during the year. Allocation to compressive strengths is based on the volumes of each that were produced by each batching plant in 2017.

LCA MODEL

An EPD Tool has been developed for the World Business Council for Sustainable Development Cement Sustainability Initiative (WBCSD CSI) to comply with requirements set out in EN 15804 (CEN, 2012) and EN 16757 (CEN, 2017). The EPD Tool has been independently reviewed against these standards by an International EPD® System and EPD Australasia verifier and has been found to be compliant. In 2019, the responsibility for the EPD Tool shifted from the WBCSD CSI to the Global Cement and Concrete Association (GCCA).

The results in this EPD were calculated using the EPD Tool which uses supporting data, based on Ecoinvent version 3.3, covering:

- Production and distribution of electricity. Data for the Japanese national grid is based on International Energy Agency (IEA) data for 2016 (International Energy Agency, 2016) and the New Zealand national grid data comes from MBIE energy statistics (Ministry of Business Innovation and Employment NZ, 2018).
- Extraction activities (raw materials and fuels)

- Pre-combustion and combustion of fuel for transport by truck and ship.
- Landfill processes

Processes covering the manufacture of cement at the MMC plant in Japan and its transport to New Zealand are reported in a separate Holcim NZ Ltd EPD (number: S-P-00850) registered with EPD Australasia.

All MMC production data (raw material quantities, production quantities, electricity usage etc) comes from MMC's internal database and is independently verified by a third-party reviewer. Data for electricity usage at Holcim NZ depots and transport quantities comes from Holcim NZ's internal SAP database. Allied Concrete batching plant production data (raw materials, production quantities, electricity usage etc) comes from Allied Concrete's internal databases.

LCA SCENARIOS

This EPD reports modules A1 to A3 and therefore does not present scenarios.

SYSTEM BOUNDARY DECLARED IN THIS EPD

Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits and Loads Beyond System Boundary
Raw Material Supply	Transport	Manufacturing	Transport to Site	On Site Processes	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction / demolition	Transport	Waste Processing	Disposal	Reuse / Recovery / Recycling Potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

MNA = Module Not Accounted

RESULTS OF ASSESSMENT

This section presents the potential environmental impact, use of resources and waste production of 1m³ of normal ready mixed concrete at specified strengths for each of our batching plants as per illustration on page 4.

It also includes results for 1m³ of special grade 50 MPa ready mixed concrete.



POTENTIAL ENVIRONMENTAL IMPACT

PER 1M³ OF NORMAL READY MIXED CONCRETE

17.5 MPa Normal Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Alexandra	245	1.09E-05	0.828	0.310	0.0417	3.32E-04	1260
Ashburton	226	8.21E-06	0.756	0.291	0.0386	2.82E-04	1020
Ashby's Ready Mixed	226	7.33E-06	0.741	0.286	0.0381	2.33E-04	958
Auckland	258	1.02E-05	0.859	0.321	0.0439	2.87E-04	1250
Avondale	261	1.08E-05	0.874	0.325	0.0445	3.05E-04	1310
Balclutha	266	1.24E-05	0.901	0.336	0.0456	3.69E-04	1410
Blenheim	230	7.44E-06	0.762	0.294	0.0392	2.62E-04	973
Bombay	256	9.83E-06	0.857	0.322	0.0438	3.09E-04	1230
Cambridge	279	9.35E-06	0.909	0.354	0.0466	3.05E-04	1190
Christchurch	207	7.31E-06	0.689	0.265	0.0353	2.42E-04	921
Cromwell	238	8.53E-06	0.792	0.305	0.0404	3.03E-04	1070
Culverden	245	1.09E-05	0.828	0.310	0.0418	3.41E-04	1270
Dunedin	266	1.35E-05	0.903	0.330	0.0453	3.63E-04	1500
East Tamaki	249	8.36E-06	0.828	0.317	0.0427	2.88E-04	1100
Gore	223	8.11E-06	0.751	0.289	0.0384	2.92E-04	1010
Greymouth	245	9.55E-06	0.831	0.317	0.0423	3.39E-04	1150
Hamilton	271	9.12E-06	0.883	0.342	0.0453	2.79E-04	1150
Hutt Valley	249	8.27E-06	0.833	0.324	0.0427	3.21E-04	1060
Invercargill	226	8.85E-06	0.757	0.287	0.0384	2.81E-04	1070
Levin	253	1.15E-05	0.854	0.318	0.0431	3.42E-04	1330
Masterton	241	8.61E-06	0.799	0.308	0.0408	2.91E-04	1080
Matamata	281	1.04E-05	0.924	0.355	0.0472	3.27E-04	1280
Mosgiel	250	1.04E-05	0.839	0.317	0.0426	3.25E-04	1230
Nelson	236	7.91E-06	0.784	0.302	0.0402	2.79E-04	1010
New Plymouth	272	1.08E-05	0.897	0.340	0.0457	3.18E-04	1310
Normanby	245	1.10E-05	0.830	0.309	0.0419	3.39E-04	1280
Otorohanga	297	1.15E-05	0.989	0.381	0.0505	3.98E-04	1390
Palmerston North	248	1.06E-05	0.836	0.314	0.0423	3.30E-04	1250
Queenstown	257	1.25E-05	0.867	0.319	0.0435	3.35E-04	1390
Rangiora	231	8.89E-06	0.772	0.294	0.0393	2.89E-04	1090
Rotorua	294	1.35E-05	0.989	0.367	0.0500	3.93E-04	1560
Silverdale	251	9.53E-06	0.838	0.315	0.0429	2.90E-04	1200
Tairua	297	1.51E-05	1.000	0.368	0.0503	4.22E-04	1700
Taupo	262	1.35E-05	0.892	0.325	0.0446	3.64E-04	1500
Tauranga	241	8.63E-06	0.802	0.306	0.0411	2.81E-04	1090
Timaru	224	7.18E-06	0.743	0.290	0.0381	2.60E-04	924
Waipapa	263	1.12E-05	0.888	0.330	0.0451	3.45E-04	1350
Waitara	264	1.08E-05	0.877	0.330	0.0446	3.19E-04	1300
Wanaka	253	1.16E-05	0.850	0.316	0.0428	3.28E-04	1330
Wellington	246	7.55E-06	0.811	0.317	0.0418	2.66E-04	992
Whakatane	274	1.34E-05	0.928	0.342	0.0467	3.85E-04	1510
Whanganui	234	1.05E-05	0.796	0.297	0.0402	3.30E-04	1220
Whangarei	262	1.08E-05	0.888	0.330	0.0453	3.43E-04	1310
Whitianga	301	1.45E-05	1.010	0.372	0.0507	3.94E-04	1650

POTENTIAL ENVIRONMENTAL IMPACT

PER 1M³ OF NORMAL READY MIXED CONCRETE

20 MPa Normal Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Alexandra	269	1.14E-05	0.900	0.340	0.0455	3.45E-04	1340
Ashburton	240	8.42E-06	0.794	0.307	0.0406	2.88E-04	1060
Ashby's Ready Mixed	225	7.27E-06	0.739	0.285	0.0379	2.32E-04	951
Auckland	269	1.04E-05	0.892	0.335	0.0457	2.92E-04	1280
Avondale	273	1.10E-05	0.907	0.339	0.0463	3.09E-04	1340
Balclutha	290	1.28E-05	0.971	0.365	0.0493	3.79E-04	1480
Blenheim	245	7.77E-06	0.807	0.313	0.0415	2.69E-04	1020
Bombay	268	1.01E-05	0.892	0.337	0.0457	3.14E-04	1270
Cambridge	293	9.69E-06	0.953	0.371	0.0489	3.13E-04	1240
Christchurch	228	7.60E-06	0.753	0.291	0.0386	2.51E-04	981
Cromwell	257	9.05E-06	0.851	0.329	0.0435	3.14E-04	1130
Culverden	255	1.11E-05	0.858	0.323	0.0434	3.45E-04	1290
Dunedin	289	1.41E-05	0.972	0.358	0.0489	3.77E-04	1590
East Tamaki	259	8.54E-06	0.857	0.329	0.0442	2.92E-04	1130
Gore	236	8.42E-06	0.790	0.305	0.0404	2.99E-04	1050
Greymouth	254	9.80E-06	0.859	0.328	0.0438	3.45E-04	1190
Hamilton	291	9.53E-06	0.942	0.367	0.0484	2.88E-04	1220
Hutt Valley	259	8.45E-06	0.861	0.335	0.0442	3.26E-04	1090
Invercargill	232	9.01E-06	0.776	0.295	0.0395	2.85E-04	1090
Levin	257	1.16E-05	0.868	0.324	0.0439	3.49E-04	1340
Masterton	248	8.78E-06	0.821	0.317	0.0421	2.95E-04	1100
Matamata	297	1.07E-05	0.973	0.375	0.0498	3.36E-04	1330
Mosgiel	271	1.11E-05	0.905	0.343	0.0460	3.39E-04	1320
Nelson	246	8.11E-06	0.815	0.315	0.0418	2.84E-04	1040
New Plymouth	293	1.15E-05	0.968	0.368	0.0494	3.41E-04	1390
Normanby	256	1.13E-05	0.862	0.323	0.0436	3.44E-04	1320
Otorohanga	311	1.18E-05	1.030	0.397	0.0526	4.05E-04	1430
Palmerston North	256	1.08E-05	0.862	0.324	0.0436	3.39E-04	1280
Queenstown	276	1.29E-05	0.924	0.342	0.0464	3.46E-04	1460
Rangiora	242	9.11E-06	0.805	0.308	0.0410	2.94E-04	1120
Rotorua	302	1.36E-05	1.010	0.377	0.0512	3.97E-04	1580
Silverdale	264	9.84E-06	0.880	0.332	0.0451	3.04E-04	1240
Tairua	311	1.55E-05	1.050	0.385	0.0525	4.30E-04	1750
Taupo	284	1.45E-05	0.966	0.352	0.0484	3.92E-04	1610
Tauranga	258	8.98E-06	0.851	0.326	0.0437	2.89E-04	1140
Timaru	233	7.30E-06	0.769	0.301	0.0395	2.64E-04	957
Waipapa	268	1.14E-05	0.905	0.336	0.0460	3.49E-04	1370
Waitara	285	1.14E-05	0.943	0.357	0.0480	3.41E-04	1370
Wanaka	276	1.21E-05	0.919	0.344	0.0463	3.41E-04	1400
Wellington	251	7.64E-06	0.827	0.323	0.0427	2.70E-04	1010
Whakatane	287	1.38E-05	0.971	0.359	0.0489	3.93E-04	1560
Whanganui	246	1.08E-05	0.833	0.312	0.0421	3.43E-04	1260
Whangarei	274	1.10E-05	0.920	0.344	0.0471	3.42E-04	1350
Whitianga	315	1.48E-05	1.050	0.389	0.0529	4.02E-04	1700

POTENTIAL ENVIRONMENTAL IMPACT

PER 1M³ OF NORMAL READY MIXED CONCRETE

25 MPa Normal Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Alexandra	292	1.20E-05	0.970	0.368	0.0491	3.57E-04	1410
Ashburton	272	9.10E-06	0.890	0.346	0.0456	3.03E-04	1160
Ashby's Ready Mixed	249	7.72E-06	0.809	0.315	0.0416	2.43E-04	1020
Auckland	293	1.08E-05	0.963	0.365	0.0494	3.02E-04	1350
Avondale	297	1.14E-05	0.978	0.369	0.0500	3.19E-04	1410
Balclutha	311	1.31E-05	1.030	0.391	0.0525	3.87E-04	1540
Blenheim	267	8.24E-06	0.873	0.340	0.0450	2.80E-04	1090
Bombay	294	1.05E-05	0.967	0.368	0.0496	3.25E-04	1340
Cambridge	318	1.02E-05	1.030	0.402	0.0528	3.25E-04	1320
Christchurch	248	7.98E-06	0.812	0.315	0.0417	2.60E-04	1040
Cromwell	291	9.92E-06	0.955	0.371	0.0489	3.33E-04	1250
Culverden	272	1.14E-05	0.909	0.344	0.0460	3.53E-04	1340
Dunedin	305	1.42E-05	1.020	0.378	0.0514	3.80E-04	1620
East Tamaki	284	8.99E-06	0.933	0.360	0.0482	3.05E-04	1200
Gore	268	9.10E-06	0.883	0.343	0.0453	3.15E-04	1150
Greymouth	277	1.04E-05	0.929	0.356	0.0474	3.60E-04	1270
Hamilton	314	1.00E-05	1.010	0.396	0.0520	2.99E-04	1280
Hutt Valley	296	9.26E-06	0.976	0.383	0.0503	3.51E-04	1210
Invercargill	249	9.39E-06	0.825	0.315	0.0420	2.94E-04	1150
Levin	286	1.22E-05	0.954	0.359	0.0483	3.66E-04	1430
Masterton	277	9.36E-06	0.905	0.352	0.0465	3.08E-04	1190
Matamata	326	1.14E-05	1.060	0.410	0.0542	3.50E-04	1430
Mosgiel	291	1.16E-05	0.964	0.367	0.0490	3.50E-04	1390
Nelson	275	8.63E-06	0.898	0.351	0.0461	2.95E-04	1120
New Plymouth	312	1.19E-05	1.020	0.391	0.0522	3.50E-04	1450
Normanby	275	1.17E-05	0.920	0.346	0.0466	3.54E-04	1380
Otorohanga	348	1.26E-05	1.140	0.443	0.0583	4.23E-04	1550
Palmerston North	281	1.13E-05	0.935	0.355	0.0475	3.49E-04	1350
Queenstown	303	1.36E-05	1.010	0.376	0.0507	3.60E-04	1550
Rangiora	264	9.50E-06	0.871	0.335	0.0444	3.03E-04	1180
Rotorua	331	1.43E-05	1.100	0.413	0.0558	4.11E-04	1670
Silverdale	296	1.05E-05	0.976	0.371	0.0502	3.27E-04	1340
Tairua	343	1.62E-05	1.140	0.424	0.0574	4.45E-04	1850
Taupo	309	1.51E-05	1.040	0.383	0.0524	4.05E-04	1690
Tauranga	272	9.27E-06	0.894	0.345	0.0459	2.95E-04	1190
Timaru	265	7.90E-06	0.862	0.339	0.0444	2.78E-04	1050
Waipapa	300	1.19E-05	0.999	0.376	0.0510	3.62E-04	1460
Waitara	308	1.18E-05	1.010	0.385	0.0515	3.50E-04	1440
Wanaka	271	1.15E-05	0.899	0.339	0.0455	3.29E-04	1340
Wellington	279	8.02E-06	0.911	0.355	0.0472	2.76E-04	1100
Whakatane	313	1.44E-05	1.050	0.390	0.0528	4.06E-04	1650
Whanganui	264	1.11E-05	0.883	0.334	0.0448	3.45E-04	1310
Whangarei	298	1.15E-05	0.993	0.374	0.0508	3.55E-04	1420
Whitianga	342	1.52E-05	1.130	0.423	0.0570	4.11E-04	1770

POTENTIAL ENVIRONMENTAL IMPACT

PER 1M³ OF NORMAL READY MIXED CONCRETE

30 MPa Normal Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Alexandra	326	1.28E-05	1.070	0.409	0.0543	3.75E-04	1520
Ashburton	282	9.39E-06	0.921	0.359	0.0472	3.10E-04	1190
Ashby's Ready Mixed	263	8.06E-06	0.853	0.332	0.0439	2.52E-04	1070
Auckland	340	1.18E-05	1.100	0.422	0.0566	3.26E-04	1500
Avondale	344	1.24E-05	1.120	0.426	0.0573	3.43E-04	1560
Balclutha	331	1.35E-05	1.090	0.415	0.0556	3.97E-04	1600
Blenheim	297	8.81E-06	0.960	0.376	0.0495	2.89E-04	1180
Bombay	335	1.14E-05	1.090	0.419	0.0560	3.46E-04	1470
Cambridge	346	1.10E-05	1.110	0.436	0.0572	3.42E-04	1420
Christchurch	264	8.35E-06	0.861	0.335	0.0443	2.70E-04	1100
Cromwell	317	1.06E-05	1.030	0.403	0.0529	3.49E-04	1340
Culverden	292	1.19E-05	0.970	0.368	0.0492	3.65E-04	1420
Dunedin	328	1.49E-05	1.090	0.406	0.0550	3.95E-04	1700
East Tamaki	328	9.88E-06	1.060	0.414	0.0549	3.25E-04	1340
Gore	282	9.42E-06	0.925	0.361	0.0474	3.22E-04	1200
Greymouth	312	1.14E-05	1.040	0.399	0.0528	3.84E-04	1390
Hamilton	348	1.08E-05	1.110	0.437	0.0573	3.17E-04	1400
Hutt Valley	333	1.00E-05	1.090	0.428	0.0560	3.69E-04	1320
Invercargill	281	1.02E-05	0.923	0.355	0.0471	3.11E-04	1260
Levin	305	1.28E-05	1.020	0.384	0.0516	3.83E-04	1500
Masterton	308	1.01E-05	0.999	0.390	0.0513	3.24E-04	1290
Matamata	354	1.21E-05	1.140	0.445	0.0586	3.67E-04	1520
Mosgiel	315	1.24E-05	1.040	0.396	0.0529	3.67E-04	1490
Nelson	294	9.01E-06	0.956	0.375	0.0491	3.04E-04	1180
New Plymouth	342	1.26E-05	1.110	0.428	0.0569	3.67E-04	1550
Normanby	304	1.25E-05	1.010	0.382	0.0511	3.71E-04	1480
Otorohanga	364	1.30E-05	1.190	0.462	0.0609	4.34E-04	1610
Palmerston North	309	1.20E-05	1.020	0.388	0.0518	3.62E-04	1450
Queenstown	327	1.42E-05	1.080	0.405	0.0543	3.73E-04	1640
Rangiora	286	1.00E-05	0.937	0.362	0.0478	3.15E-04	1250
Rotorua	365	1.52E-05	1.210	0.455	0.0612	4.32E-04	1800
Silverdale	327	1.12E-05	1.070	0.410	0.0550	3.46E-04	1440
Tairua	373	1.71E-05	1.230	0.460	0.0621	4.65E-04	1970
Taupo	334	1.58E-05	1.120	0.414	0.0563	4.23E-04	1790
Tauranga	310	1.01E-05	1.010	0.390	0.0519	3.16E-04	1310
Timaru	292	8.46E-06	0.943	0.373	0.0486	2.91E-04	1130
Waipapa	327	1.24E-05	1.070	0.410	0.0546	3.68E-04	1510
Waitara	331	1.24E-05	1.080	0.414	0.0551	3.62E-04	1520
Wanaka	326	1.35E-05	1.070	0.406	0.0542	3.70E-04	1580
Wellington	304	8.75E-06	0.987	0.389	0.0510	3.02E-04	1170
Whakatane	340	1.52E-05	1.130	0.422	0.0569	4.22E-04	1740
Whanganui	288	1.18E-05	0.958	0.363	0.0486	3.60E-04	1400
Whangarei	290	1.12E-05	0.965	0.362	0.0494	3.43E-04	1400
Whitianga	374	1.61E-05	1.230	0.462	0.0621	4.32E-04	1890

POTENTIAL ENVIRONMENTAL IMPACT

PER 1M³ OF NORMAL READY MIXED CONCRETE

35 MPa Normal Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Alexandra	366	1.38E-05	1.190	0.457	0.0605	3.98E-04	1670
Ashburton	318	1.01E-05	1.030	0.403	0.0528	3.26E-04	1300
Ashby's Ready Mixed	293	8.61E-06	0.941	0.369	0.0485	2.65E-04	1150
Auckland	365	1.22E-05	1.170	0.454	0.0599	3.30E-04	1550
Avondale	369	1.28E-05	1.180	0.458	0.0606	3.48E-04	1610
Balclutha	351	1.38E-05	1.150	0.441	0.0587	4.04E-04	1650
Blenheim	308	9.02E-06	0.991	0.389	0.0512	2.94E-04	1230
Bombay	361	1.19E-05	1.160	0.452	0.0594	3.51E-04	1520
Cambridge	379	1.17E-05	1.210	0.477	0.0624	3.59E-04	1530
Christchurch	289	8.82E-06	0.937	0.366	0.0483	2.82E-04	1170
Cromwell	351	1.16E-05	1.140	0.444	0.0583	3.69E-04	1470
Culverden	327	1.26E-05	1.070	0.412	0.0546	3.81E-04	1520
Dunedin	348	1.48E-05	1.140	0.431	0.0579	3.97E-04	1730
East Tamaki	356	1.04E-05	1.130	0.449	0.0586	3.30E-04	1400
Gore	326	1.05E-05	1.060	0.414	0.0543	3.47E-04	1350
Greymouth	345	1.23E-05	1.140	0.439	0.0581	4.06E-04	1510
Hamilton	376	1.14E-05	1.200	0.471	0.0616	3.31E-04	1480
Hutt Valley	367	1.06E-05	1.180	0.469	0.0611	3.82E-04	1420
Invercargill	311	1.10E-05	1.010	0.391	0.0518	3.30E-04	1370
Levin	346	1.34E-05	1.130	0.432	0.0575	3.86E-04	1610
Matamata	379	1.26E-05	1.220	0.475	0.0625	3.79E-04	1600
Mosgiel	333	1.29E-05	1.090	0.418	0.0556	3.76E-04	1550
Nelson	323	9.52E-06	1.040	0.410	0.0536	3.13E-04	1260
New Plymouth	367	1.31E-05	1.180	0.457	0.0606	3.68E-04	1630
Normanby	350	1.36E-05	1.140	0.437	0.0582	3.95E-04	1640
Otorohanga	379	1.33E-05	1.230	0.481	0.0632	4.41E-04	1660
Palmerston North	345	1.27E-05	1.120	0.433	0.0574	3.81E-04	1560
Queenstown	375	1.55E-05	1.220	0.463	0.0618	4.02E-04	1810
Rangiora	312	1.05E-05	1.020	0.395	0.0519	3.27E-04	1330
Rotorua	386	1.56E-05	1.260	0.479	0.0643	4.41E-04	1860
Silverdale	358	1.19E-05	1.160	0.450	0.0595	3.57E-04	1510
Tairua	416	1.82E-05	1.360	0.513	0.0689	4.88E-04	2120
Taupo	367	1.65E-05	1.210	0.452	0.0615	4.43E-04	1910
Tauranga	337	1.07E-05	1.080	0.424	0.0557	3.26E-04	1380
Timaru	327	9.10E-06	1.050	0.417	0.0540	3.06E-04	1220
Waipapa	354	1.27E-05	1.150	0.443	0.0586	3.75E-04	1570
Waitara	369	1.31E-05	1.190	0.459	0.0608	3.70E-04	1630
Wanaka	371	1.47E-05	1.200	0.459	0.0610	3.95E-04	1740
Wellington	337	9.24E-06	1.080	0.428	0.0560	3.09E-04	1260
Whakatane	373	1.60E-05	1.230	0.463	0.0622	4.40E-04	1860
Whanganui	315	1.24E-05	1.040	0.396	0.0528	3.74E-04	1500
Whangarei	351	1.26E-05	1.140	0.440	0.0583	3.63E-04	1550
Whitianga	408	1.69E-05	1.330	0.503	0.0674	4.50E-04	2000

POTENTIAL ENVIRONMENTAL IMPACT

PER 1M³ OF NORMAL READY MIXED CONCRETE

40 MPa Normal Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Alexandra	416	1.50E-05	1.340	0.518	0.0682	4.24E-04	1840
Ashburton	367	1.12E-05	1.180	0.464	0.0605	3.51E-04	1460
Ashby's Ready Mixed	338	9.47E-06	1.070	0.424	0.0555	2.85E-04	1290
Auckland	390	1.27E-05	1.240	0.484	0.0638	3.42E-04	1640
Avondale	392	1.32E-05	1.250	0.485	0.0641	3.58E-04	1690
Balclutha	381	1.42E-05	1.240	0.478	0.0633	4.15E-04	1730
Blenheim	327	9.43E-06	1.050	0.413	0.0540	3.02E-04	1280
Bombay	391	1.25E-05	1.250	0.489	0.0642	3.66E-04	1620
Cambridge	414	1.25E-05	1.310	0.519	0.0677	3.76E-04	1640
Christchurch	336	9.67E-06	1.070	0.423	0.0553	3.01E-04	1300
Cromwell	402	1.28E-05	1.290	0.506	0.0660	3.96E-04	1640
Culverden	365	1.34E-05	1.190	0.458	0.0605	4.00E-04	1640
Dunedin	384	1.55E-05	1.250	0.476	0.0636	4.13E-04	1830
East Tamaki	380	1.08E-05	1.210	0.479	0.0625	3.42E-04	1480
Gore	375	1.16E-05	1.200	0.474	0.0619	3.71E-04	1510
Greymouth	390	1.34E-05	1.270	0.494	0.0651	4.34E-04	1670
Hamilton	401	1.19E-05	1.270	0.502	0.0656	3.43E-04	1570
Hutt Valley	406	1.14E-05	1.300	0.518	0.0673	4.01E-04	1530
Invercargill	379	1.27E-05	1.220	0.475	0.0623	3.66E-04	1590
Levin	374	1.40E-05	1.220	0.468	0.0620	4.08E-04	1700
Masterton	378	1.15E-05	1.210	0.476	0.0621	3.57E-04	1510
Matamata	412	1.33E-05	1.320	0.516	0.0676	3.94E-04	1710
Mosgiel	380	1.42E-05	1.230	0.475	0.0630	4.05E-04	1730
Nelson	361	1.00E-05	1.150	0.455	0.0591	3.18E-04	1360
New Plymouth	377	1.32E-05	1.210	0.469	0.0620	3.72E-04	1660
Normanby	372	1.42E-05	1.210	0.464	0.0616	4.07E-04	1710
Otorohanga	414	1.41E-05	1.340	0.523	0.0686	4.59E-04	1770
Palmerston North	367	1.30E-05	1.180	0.459	0.0605	3.77E-04	1610
Queenstown	435	1.70E-05	1.400	0.536	0.0712	4.43E-04	2020
Rangiora	362	1.14E-05	1.160	0.456	0.0596	3.49E-04	1470
Rotorua	415	1.62E-05	1.350	0.514	0.0688	4.56E-04	1970
Silverdale	396	1.25E-05	1.270	0.496	0.0652	3.70E-04	1620
Tairua	445	1.90E-05	1.450	0.547	0.0734	5.05E-04	2220
Taupo	389	1.68E-05	1.280	0.480	0.0646	4.39E-04	1950
Tauranga	364	1.12E-05	1.170	0.456	0.0603	3.42E-04	1500
Timaru	389	1.02E-05	1.230	0.491	0.0636	3.34E-04	1430
Waipapa	379	1.30E-05	1.220	0.474	0.0626	3.86E-04	1640
Waitara	373	1.32E-05	1.200	0.465	0.0613	3.71E-04	1640
Wanaka	424	1.60E-05	1.370	0.524	0.0694	4.25E-04	1930
Wellington	368	9.85E-06	1.170	0.467	0.0608	3.24E-04	1350
Whakatane	395	1.65E-05	1.290	0.490	0.0655	4.51E-04	1930
Whanganui	350	1.32E-05	1.140	0.439	0.0582	3.91E-04	1600
Whangarei	388	1.32E-05	1.250	0.485	0.0640	3.82E-04	1660
Whitianga	423	1.69E-05	1.370	0.521	0.0695	4.51E-04	2020

POTENTIAL ENVIRONMENTAL IMPACT

PER 1M³ OF NORMAL READY MIXED CONCRETE

45 MPa Normal Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Ashby's Ready Mixed	387	1.03E-05	1.220	0.485	0.0628	3.04E-04	1420
Auckland	425	1.33E-05	1.340	0.526	0.0693	3.58E-04	1740
Avondale	436	1.40E-05	1.380	0.541	0.0710	3.76E-04	1790
Balclutha	417	1.48E-05	1.340	0.522	0.0688	4.30E-04	1820
Blenheim	382	1.06E-05	1.210	0.479	0.0623	3.27E-04	1450
Bombay	409	1.27E-05	1.300	0.508	0.0674	3.79E-04	1710
Christchurch	385	1.05E-05	1.220	0.485	0.0629	3.21E-04	1440
Culverden	413	1.42E-05	1.330	0.517	0.0678	4.19E-04	1760
East Tamaki	415	1.15E-05	1.310	0.521	0.0679	3.57E-04	1590
Hamilton	425	1.23E-05	1.340	0.531	0.0691	3.52E-04	1620
Nelson	385	1.04E-05	1.210	0.484	0.0628	3.28E-04	1450
Palmerston North	407	1.38E-05	1.300	0.508	0.0667	3.96E-04	1740
Rangiora	387	1.19E-05	1.240	0.488	0.0635	3.60E-04	1540
Silverdale	419	1.30E-05	1.330	0.525	0.0687	3.80E-04	1680
Tairua	469	1.93E-05	1.510	0.576	0.0771	5.15E-04	2320
Waitara	423	1.43E-05	1.350	0.525	0.0691	3.98E-04	1810
Wellington	406	1.03E-05	1.280	0.513	0.0665	3.32E-04	1460
Whangarei	414	1.36E-05	1.320	0.517	0.0679	3.90E-04	1730

POTENTIAL ENVIRONMENTAL IMPACT

PER 1M³ OF NORMAL READY MIXED CONCRETE

50 MPa Normal Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Alexandra	443	1.57E-05	1.420	0.550	0.0724	4.39E-04	1950
Ashburton	450	1.28E-05	1.420	0.565	0.0733	3.90E-04	1720
Ashby's Ready Mixed	417	1.09E-05	1.300	0.521	0.0676	3.18E-04	1530
Auckland	458	1.39E-05	1.440	0.567	0.0743	3.71E-04	1830
Avondale, Auckland	463	1.45E-05	1.460	0.573	0.0752	3.88E-04	1890
Balclutha	449	1.56E-05	1.440	0.562	0.0739	4.47E-04	1930
Blenheim	400	1.10E-05	1.260	0.502	0.0652	3.36E-04	1510
Bombay	456	1.36E-05	1.440	0.568	0.0741	3.93E-04	1820
Cambridge	438	1.30E-05	1.380	0.546	0.0714	3.89E-04	1750
Christchurch	412	1.10E-05	1.300	0.517	0.0671	3.35E-04	1530
Culverden	457	1.50E-05	1.460	0.572	0.0747	4.38E-04	1890
Dunedin	448	1.58E-05	1.430	0.556	0.0733	4.28E-04	1950
East Tamaki, Auckland	451	1.21E-05	1.410	0.565	0.0733	3.72E-04	1690
Hamilton	427	1.23E-05	1.340	0.533	0.0696	3.55E-04	1660
Hutt Valley	482	1.28E-05	1.530	0.612	0.0790	4.38E-04	1760
Invercargill	410	1.34E-05	1.310	0.511	0.0674	3.86E-04	1720
Levin	439	1.50E-05	1.400	0.547	0.0718	4.26E-04	1880
Matamata	440	1.39E-05	1.400	0.550	0.0719	4.08E-04	1790
Mosgiel	448	1.61E-05	1.440	0.557	0.0735	4.45E-04	1980
Nelson	416	1.10E-05	1.310	0.523	0.0676	3.42E-04	1530
New Plymouth	449	1.50E-05	1.420	0.555	0.0731	4.12E-04	1930
Palmerston North	462	1.55E-05	1.480	0.579	0.0760	4.70E-04	1940
Queenstown	462	1.78E-05	1.480	0.568	0.0754	4.52E-04	2150
Rangiora	441	1.29E-05	1.390	0.553	0.0718	3.85E-04	1710
Silverdale	451	1.34E-05	1.420	0.563	0.0735	3.88E-04	1780
Taupo	453	1.78E-05	1.460	0.559	0.0743	4.61E-04	2120
Tauranga	431	1.25E-05	1.360	0.538	0.0703	3.70E-04	1690
Waipapa	431	1.37E-05	1.370	0.539	0.0705	4.05E-04	1770
Waitara	445	1.48E-05	1.410	0.551	0.0726	4.10E-04	1900
Wanaka	457	1.70E-05	1.470	0.563	0.0749	4.49E-04	2070
Wellington	442	1.13E-05	1.390	0.558	0.0724	3.63E-04	1580
Whakatane	457	1.79E-05	1.470	0.563	0.0749	4.84E-04	2170
Whangarei	456	1.45E-05	1.450	0.569	0.0746	4.14E-04	1860

50 MPa Special Grade

Batching plant name	Global warming potential	Ozone depletion potential	Acidification potential of soil and water	Eutrophication potential	Formation potential of tropospheric ozone	Abiotic depletion potential - non-fossil resources	Abiotic depletion potential - fossil resources
	kg CO ₂ equ.	kg CFC 11 equ.	kg SO ₂ equ.	kg PO ₄ ³⁻ equ.	kg C ₂ H ₂ equ.	kg Sb equ.	MJ, NCV
Auckland	353	1.16E-05	1.120	0.437	0.0578	3.18E-04	1510
Avondale	362	1.21E-05	1.230	0.436	0.0646	3.97E-04	1840

USE OF RESOURCES

PER 1M³ OF NORMAL READY MIXED CONCRETE

17.5 MPa Normal Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Alexandra	67.5	0	67.5	1290	0	1290	67.7	8.84	75.8	5.07
Ashburton	94.3	0	94.3	1050	0	1050	66.0	8.63	74.0	4.56
Ashby's Ready Mixed	79.0	0	79.0	987	0	987	67.6	8.83	75.7	4.46
Auckland	119	0	119	1290	0	1290	73.5	9.60	82.3	4.77
Avondale	91.9	0	91.9	1350	0	1350	73.4	9.59	82.2	4.88
Balclutha	193	0	193	1450	0	1450	72.2	9.44	80.9	5.59
Blenheim	64.6	0	64.6	1000	0	1000	68.8	8.99	77.1	4.27
Bombay	66.3	0	66.3	1270	0	1270	73.2	9.56	82.0	4.66
Cambridge	67.6	0	67.6	1230	0	1230	83.4	10.90	93.4	4.58
Christchurch	85.2	0	85.2	950	0	950	84.8	7.92	67.9	4.62
Cromwell	61.2	0	61.2	1100	0	1100	69.6	9.08	77.9	4.93
Culverden	68.7	0	68.7	1300	0	1300	67.2	8.78	75.3	5.20
Dunedin	102	0	102	1540	0	1540	70.2	9.16	78.6	5.38
East Tamaki	114	0	114	1140	0	1140	73.7	9.63	82.6	4.60
Gore	77.4	0	77.4	1040	0	1040	65.1	8.50	72.9	5.60
Greymouth	78.9	0	78.9	1190	0	1190	70.0	9.15	78.4	5.62
Hamilton	79.1	0	79.1	1190	0	1190	81.4	10.60	91.1	4.63
Hutt Valley	89.1	0	89.1	1090	0	1090	74.5	9.72	83.4	4.66
Invercargill	90.4	0	90.4	1100	0	1100	64.6	8.44	72.3	4.55
Levin	82.7	0	82.7	1360	0	1360	69.0	9.02	77.3	5.29
Masterton	66.1	0	66.1	1110	0	1110	70.5	9.21	79.0	4.97
Matamata	76.4	0	76.4	1320	0	1320	82.1	10.70	91.9	4.61
Mosgiel	95.1	0	95.1	1270	0	1270	70.3	9.18	78.7	5.17
Nelson	71.7	0	71.7	1040	0	1040	70.0	9.15	78.4	4.65
New Plymouth	71.4	0	71.4	1340	0	1340	77.7	10.10	87.0	4.51
Normanby	80.6	0	80.6	1320	0	1320	66.9	8.73	74.9	4.98
Otorohanga	122	0	122	1430	0	1430	85.8	11.20	96.1	5.18
Palmerston North	74.1	0	74.1	1280	0	1280	69.0	9.01	77.2	4.81
Queenstown	70.9	0	70.9	1430	0	1430	69.1	9.03	77.4	5.27
Rangiora	76.8	0	76.8	1120	0	1120	66.1	8.64	74.1	5.05
Rotorua	117	0	117	1600	0	1600	80.2	10.50	89.8	5.29
Silverdale	92.0	0	92.0	1230	0	1230	72.1	9.42	80.7	4.66
Tairua	80.7	0	80.7	1740	0	1740	78.1	10.20	87.4	4.93
Taupo	76.5	0	76.5	1540	0	1540	68.4	8.93	76.6	4.95
Tauranga	86.1	0	86.1	1130	0	1130	70.5	9.21	79.0	4.74
Timaru	69.3	0	69.3	953	0	953	67.6	8.83	75.7	5.26
Waipapa	75.9	0	75.9	1390	0	1390	72.9	9.52	81.6	4.79
Waitara	63.6	0	63.6	1340	0	1340	74.6	9.75	83.5	4.48
Wanaka	68.0	0	68.0	1360	0	1360	69.2	9.04	77.5	4.52
Wellington	76.8	0	76.8	1020	0	1020	75.1	9.81	84.1	4.70
Whakatane	72.3	0	72.3	1550	0	1550	72.9	9.52	81.6	4.97
Whanganui	72.5	0	72.5	1250	0	1250	64.2	8.39	71.9	4.91
Whangarei	96.4	0	96.4	1350	0	1350	73.4	9.59	82.2	4.88
Whitianga	78.5	0	78.5	1690	0	1690	80.9	10.60	90.6	4.96

USE OF RESOURCES

PER 1M³ OF NORMAL READY MIXED CONCRETE

20 MPa Normal Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Alexandra	71.0	0	71.0	1380	0	1380	75.7	9.89	84.8	51.0
Ashburton	96.7	0	96.7	1090	0	1090	70.5	9.21	79.0	4.54
Ashby's Ready Mixed	78.8	0	78.8	980	0	980	73.7	8.82	75.6	4.42
Auckland	120.0	0	120.0	1320	0	1320	77.4	10.10	86.7	4.77
Avondale	93.5	0	93.5	1380	0	1380	77.3	10.10	86.6	4.88
Balclutha	196.0	0	196.0	1520	0	1520	80.4	10.50	90.0	5.61
Blenheim	66.6	0	66.6	1050	0	1050	74.0	9.66	82.8	4.28
Bombay	67.8	0	67.8	1300	0	1300	77.4	10.10	86.7	4.68
Cambridge	69.8	0	69.8	1280	0	1280	88.2	11.50	98.7	4.62
Christchurch	88.7	0	88.7	1010	0	1010	74.9	8.88	76.1	4.67
Cromwell	64.0	0	64.0	1170	0	1170	75.9	9.92	85.0	5.00
Culverden	70.0	0	70.0	1330	0	1330	70.7	9.24	79.2	5.23
Dunedin	105.0	0	105.0	1630	0	1630	77.3	10.10	86.6	5.49
East Tamaki	116.0	0	116.0	1170	0	1170	77.1	10.10	86.4	4.61
Gore	79.4	0	79.4	1080	0	1080	69.4	9.07	77.7	5.64
Greymouth	80.3	0	80.3	1220	0	1220	73.0	9.53	81.7	5.64
Hamilton	82.0	0	82.0	1250	0	1250	88.1	11.50	98.7	4.67
Hutt Valley	90.7	0	90.7	1120	0	1120	77.5	10.10	86.8	4.70
Invercargill	91.5	0	91.5	1120	0	1120	66.5	8.69	74.5	4.56
Levin	83.7	0	83.7	1370	0	1370	70.5	9.21	78.9	5.29
Masterton	67.2	0	67.2	1140	0	1140	73.0	9.54	81.8	4.97
Matamata	78.9	0	78.9	1370	0	1370	87.6	11.40	98.1	4.66
Mosgiel	98.5	0	98.5	1350	0	1350	77.1	10.10	86.3	5.25
Nelson	73.0	0	73.0	1070	0	1070	73.6	9.61	82.4	4.66
New Plymouth	75.6	0	75.6	1430	0	1430	84.4	11.00	94.6	4.69
Normanby	82.3	0	82.3	1360	0	1360	70.5	9.21	79.0	4.98
Otorohanga	124.0	0	124.0	1470	0	1470	90.3	11.80	101.0	5.21
Palmerston North	75.7	0	75.7	1310	0	1310	71.5	9.34	80.1	4.86
Queenstown	73.6	0	73.6	1490	0	1490	75.3	9.83	84.3	5.30
Rangiora	78.3	0	78.3	1150	0	1150	70.0	9.15	78.4	5.08
Rotorua	118.0	0	118.0	1620	0	1620	82.9	10.80	92.8	5.31
Silverdale	94.5	0	94.5	1280	0	1280	76.3	9.97	85.5	4.72
Tairua	82.7	0	82.7	1790	0	1790	82.5	10.80	92.4	4.96
Taupo	81.0	0	81.0	1650	0	1650	74.6	9.74	83.5	5.11
Tauranga	88.5	0	88.5	1180	0	1180	76.1	9.94	85.2	4.75
Timaru	71.1	0	71.1	988	0	988	70.7	9.23	79.1	5.27
Waipapa	76.8	0	76.8	1410	0	1410	74.6	9.75	83.6	4.79
Waitara	67.3	0	67.3	1410	0	1410	81.3	10.60	91.0	4.63
Wanaka	71.2	0	71.2	1440	0	1440	76.8	10.00	86.0	4.56
Wellington	78.0	0	78.0	1050	0	1050	76.7	10.00	85.9	4.71
Whakatane	74.6	0	74.6	1600	0	1600	77.4	10.10	86.7	5.00
Whanganui	74.8	0	74.8	1290	0	1290	67.8	8.86	76.0	4.99
Whangarei	97.7	0	97.7	1390	0	1390	77.5	10.10	86.8	4.83
Whitianga	80.6	0	80.6	1740	0	1740	85.4	11.20	95.6	4.99

USE OF RESOURCES

PER 1M³ OF NORMAL READY MIXED CONCRETE

25 MPa Normal Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Alexandra	74.1	0	74.1	1450	0	1450	83.4	10.90	93.4	51.7
Ashburton	101.0	0	101.0	1200	0	1200	81.3	10.60	91.1	4.65
Ashby's Ready Mixed	82.2	0	82.2	1050	0	1050	79.4	9.88	84.7	4.47
Auckland	124.0	0	124.0	1390	0	1390	85.7	11.20	96.0	4.82
Avondale	97.0	0	97.0	1450	0	1450	85.8	11.20	96.0	4.92
Balclutha	199.0	0	199.0	1580	0	1580	87.6	11.40	98.1	5.65
Blenheim	70.0	0	70.0	1120	0	1120	81.5	10.60	91.3	4.34
Bombay	71.5	0	71.5	1380	0	1380	86.1	11.20	96.4	4.72
Cambridge	73.4	0	73.4	1360	0	1360	96.5	12.60	108.0	4.66
Christchurch	91.6	0	91.6	1070	0	1070	81.3	9.77	83.8	4.72
Cromwell	69.0	0	69.0	1290	0	1290	87.3	11.40	97.8	5.07
Culverden	72.5	0	72.5	1370	0	1370	76.8	10.00	86.0	5.26
Dunedin	108.0	0	108.0	1660	0	1660	83.4	10.90	93.4	5.49
East Tamaki	120.0	0	120.0	1240	0	1240	85.6	11.20	95.9	4.65
Gore	84.1	0	84.1	1190	0	1190	79.9	10.40	89.4	5.72
Greymouth	83.9	0	83.9	1310	0	1310	80.5	10.50	90.2	5.71
Hamilton	85.0	0	85.0	1320	0	1320	96.1	12.60	108.0	4.73
Hutt Valley	96.8	0	96.8	1250	0	1250	90.2	11.80	101.0	4.83
Invercargill	93.9	0	93.9	1180	0	1180	72.2	9.43	80.8	4.60
Levin	88.2	0	88.2	1460	0	1460	80.1	10.50	89.7	5.38
Masterton	71.3	0	71.3	1230	0	1230	82.7	10.80	92.6	5.02
Matamata	83.5	0	83.5	1470	0	1470	97.1	12.70	109.0	4.72
Mosgiel	101.0	0	101.0	1430	0	1430	83.5	10.90	93.5	5.28
Nelson	76.8	0	76.8	1150	0	1150	83.6	10.90	93.6	4.72
New Plymouth	78.4	0	78.4	1490	0	1490	90.7	11.80	102.0	4.74
Normanby	85.0	0	85.0	1420	0	1420	77.0	10.10	86.3	5.01
Otorohanga	129.0	0	129.0	1590	0	1590	103.0	13.40	115.0	5.28
Palmerston North	79.2	0	79.2	1390	0	1390	80.1	10.50	89.6	4.90
Queenstown	77.6	0	77.6	1590	0	1590	84.5	11.00	94.6	5.34
Rangiora	81.6	0	81.6	1210	0	1210	77.7	10.10	87.0	5.12
Rotorua	122.0	0	122.0	1720	0	1720	92.7	12.10	104.0	5.37
Silverdale	99.9	0	99.9	1380	0	1380	86.8	11.30	97.2	4.85
Tairua	87.5	0	87.5	1890	0	1890	93.2	12.20	104.0	5.02
Taupo	84.8	0	84.8	1740	0	1740	83.1	10.90	93.0	5.15
Tauranga	90.5	0	90.5	1220	0	1220	81.1	10.60	90.8	4.78
Timaru	75.6	0	75.6	1080	0	1080	81.4	10.60	91.2	5.34
Waipapa	81.4	0	81.4	1500	0	1500	85.6	11.20	95.8	4.85
Waitara	70.6	0	70.6	1480	0	1480	89.1	11.60	99.8	4.66
Wanaka	69.7	0	69.7	1380	0	1380	76.6	10.00	85.8	4.19
Wellington	82.5	0	82.5	1140	0	1140	86.3	11.30	96.7	4.66
Whakatane	78.0	0	78.0	1690	0	1690	85.8	11.20	96.1	5.07
Whanganui	76.8	0	76.8	1350	0	1350	74.1	9.67	82.9	4.97
Whangarei	101.0	0	101.0	1460	0	1460	85.7	11.20	96.0	4.89
Whitianga	84.7	0	84.7	1810	0	1810	95.1	12.40	106.0	5.03

USE OF RESOURCES

PER 1M³ OF NORMAL READY MIXED CONCRETE

30 MPa Normal Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Alexandra	79.1	0	79.1	1560	0	1560	94.5	12.30	106.0	5.25
Ashburton	103.0	0	103.0	1230	0	1230	84.5	11.00	94.7	4.78
Ashby's Ready Mixed	84.8	0	84.8	1100	0	1100	89.5	10.50	89.8	4.60
Auckland	131.0	0	131.0	1550	0	1550	101.0	13.20	113.0	5.03
Avondale	104.0	0	104.0	1600	0	1600	101.0	13.20	113.0	5.14
Balclutha	202.0	0	202.0	1640	0	1640	94.3	12.30	106.0	5.69
Blenheim	74.1	0	74.1	1220	0	1220	91.5	11.90	102.0	4.44
Bombay	77.9	0	77.9	1520	0	1520	99.9	13.10	112.0	4.93
Cambridge	77.8	0	77.8	1460	0	1460	106.0	13.80	118.0	4.84
Christchurch	94.4	0	94.4	1130	0	1130	90.3	10.40	89.5	4.87
Cromwell	72.7	0	72.7	1370	0	1370	95.9	12.50	107.0	5.17
Culverden	75.9	0	75.9	1460	0	1460	82.9	10.80	92.9	5.41
Dunedin	111.0	0	111.0	1750	0	1750	95.5	11.80	102.0	5.68
East Tamaki	126.0	0	126.0	1380	0	1380	100.0	13.10	112.0	4.86
Gore	86.0	0	86.0	1230	0	1230	84.7	11.10	94.8	5.73
Greymouth	89.4	0	89.4	1430	0	1430	91.6	12.00	103.0	5.93
Hamilton	90.9	0	90.9	1440	0	1440	107.0	14.00	120.0	5.03
Hutt Valley	102.0	0	102.0	1360	0	1360	103.0	13.40	115.0	5.00
Invercargill	98.8	0	98.8	1290	0	1290	83.0	10.80	92.9	4.70
Levin	91.7	0	91.7	1540	0	1540	86.2	11.30	96.6	5.57
Masterton	76.1	0	76.1	1330	0	1330	93.1	12.20	104.0	5.18
Matamata	87.4	0	87.4	1570	0	1570	106.0	13.90	119.0	4.86
Mosgiel	105.0	0	105.0	1530	0	1530	90.8	11.90	102.0	5.49
Nelson	79.9	0	79.9	1220	0	1220	90.0	11.80	101.0	4.80
New Plymouth	83.0	0	83.0	1600	0	1600	100.0	13.10	112.0	4.88
Normanby	89.3	0	89.3	1520	0	1520	86.4	11.30	96.8	5.33
Otorohanga	132.0	0	132.0	1660	0	1660	108.0	14.10	121.0	5.41
Palmerston North	83.4	0	83.4	1490	0	1490	89.1	11.60	99.8	5.04
Queenstown	81.4	0	81.4	1680	0	1680	92.2	12.00	103.0	5.43
Rangiora	84.8	0	84.8	1280	0	1280	84.9	11.10	95.0	5.27
Rotorua	127.0	0	127.0	1850	0	1850	104.0	13.60	116.0	5.54
Silverdale	105.0	0	105.0	1480	0	1480	97.0	12.70	109.0	5.03
Tairua	92.2	0	92.2	2010	0	2010	103.0	13.40	115.0	5.18
Taupo	88.6	0	88.6	1830	0	1830	91.0	11.90	102.0	5.34
Tauranga	96.5	0	96.5	1350	0	1350	93.4	12.20	105.0	4.94
Timaru	79.6	0	79.6	1160	0	1160	90.5	11.80	101.0	5.50
Waipapa	83.4	0	83.4	1550	0	1550	95.2	12.40	107.0	4.98
Waitara	73.9	0	73.9	1560	0	1560	96.7	12.60	108.0	4.79
Wanaka	78.7	0	78.7	1620	0	1620	93.4	12.20	105.0	4.70
Wellington	86.3	0	86.3	1210	0	1210	94.5	12.30	106.0	4.95
Whakatane	82.1	0	82.1	1790	0	1790	94.4	12.30	106.0	5.22
Whanganui	80.6	0	80.6	1440	0	1440	81.9	10.70	91.7	5.11
Whangarei	99.8	0	99.8	1440	0	1440	82.8	10.80	92.7	4.83
Whitianga	89.7	0	89.7	1940	0	1940	105.0	13.70	118.0	5.20

USE OF RESOURCES

PER 1M³ OF NORMAL READY MIXED CONCRETE

35 MPa Normal Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Alexandra	85.3	0	85.3	1710	0	1710	107.0	14.00	120.0	5.45
Ashburton	108.0	0	108.0	1340	0	1340	96.9	12.70	109.0	4.82
Ashby's Ready Mixed	88.9	0	88.9	1190	0	1190	97.3	11.80	101.0	4.66
Auckland	132.0	0	132.0	1590	0	1590	110.0	14.40	123.0	5.06
Avondale	106.0	0	106.0	1650	0	1650	110.0	14.40	123.0	5.17
Balclutha	205.0	0	205.0	1690	0	1690	102.0	13.30	114.0	5.77
Blenheim	76.5	0	76.5	1270	0	1270	94.9	12.40	106.0	4.50
Bombay	79.6	0	79.6	1570	0	1570	109.0	14.30	122.0	4.97
Cambridge	82.7	0	82.7	1570	0	1570	117.0	15.20	131.0	4.92
Christchurch	98.2	0	98.2	1210	0	1210	100.0	11.60	99.1	4.90
Cromwell	78.1	0	78.1	1510	0	1510	106.0	13.90	119.0	5.32
Culverden	80.9	0	80.9	1560	0	1560	95.0	12.40	106.0	5.45
Dunedin	114.0	0	114.0	1770	0	1770	100.0	12.80	110.0	5.64
East Tamaki	128.0	0	128.0	1440	0	1440	110.0	14.40	124.0	4.90
Gore	92.6	0	92.6	1390	0	1390	98.9	12.90	111.0	5.90
Greymouth	94.6	0	94.6	1560	0	1560	102.0	13.40	115.0	6.05
Hamilton	94.8	0	94.8	1530	0	1530	116.0	15.20	130.0	5.17
Hutt Valley	107.0	0	107.0	1460	0	1460	114.0	14.90	128.0	5.03
Invercargill	104.0	0	104.0	1410	0	1410	92.3	12.10	103.0	4.88
Levin	96.4	0	96.4	1660	0	1660	100.0	13.10	112.0	5.55
Matamata	91.1	0	91.1	1650	0	1650	115.0	15.00	128.0	4.95
Mosgiel	108.0	0	108.0	1590	0	1590	96.8	12.60	108.0	5.49
Nelson	83.8	0	83.8	1300	0	1300	100.0	13.10	112.0	4.87
New Plymouth	85.7	0	85.7	1670	0	1670	109.0	14.20	122.0	4.84
Normanby	96.0	0	96.0	1680	0	1680	101.0	13.20	113.0	5.39
Otorohanga	134.0	0	134.0	1700	0	1700	113.0	14.70	126.0	5.46
Palmerston North	88.7	0	88.7	1600	0	1600	101.0	13.20	113.0	5.08
Queenstown	88.4	0	88.4	1850	0	1850	108.0	14.00	120.0	5.64
Rangiora	88.6	0	88.6	1360	0	1360	94.1	12.30	105.0	5.31
Rotorua	130.0	0	130.0	1910	0	1910	111.0	14.40	124.0	5.58
Silverdale	108.0	0	108.0	1550	0	1550	108.0	14.10	121.0	5.11
Tairua	98.7	0	98.7	2170	0	2170	117.0	15.20	131.0	5.27
Taupo	97.4	0	97.4	1960	0	1960	101.0	13.20	113.0	5.44
Tauranga	99.3	0	99.3	1420	0	1420	103.0	13.40	115.0	4.98
Timaru	84.4	0	84.4	1260	0	1260	103.0	13.40	115.0	5.57
Waipapa	87.1	0	87.1	1610	0	1610	105.0	13.70	118.0	5.01
Waitara	78.7	0	78.7	1670	0	1670	110.0	14.30	123.0	4.78
Wanaka	85.5	0	85.5	1780	0	1780	108.0	14.00	120.0	4.90
Wellington	90.7	0	90.7	1300	0	1300	106.0	13.80	119.0	4.97
Whakatane	87.2	0	87.2	1910	0	1910	106.0	13.80	118.0	5.28
Whanganui	85.1	0	85.1	1540	0	1540	90.6	11.80	101.0	5.17
Whangarei	106.0	0	106.0	1600	0	1600	104.0	13.60	117.0	4.99
Whitianga	94.7	0	94.7	2050	0	2050	116.0	15.20	130.0	5.23

USE OF RESOURCES

PER 1M³ OF NORMAL READY MIXED CONCRETE

40 MPa Normal Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Alexandra	92.9	0	92.9	1890	0	1890	124.0	16.10	138.0	5.55
Ashburton	115.0	0	115.0	1500	0	1500	113.0	14.80	127.0	4.94
Ashby's Ready Mixed	95.5	0	95.5	1330	0	1330	110.0	13.80	118.0	4.77
Auckland	137.0	0	137.0	1680	0	1680	118.0	15.50	133.0	5.11
Avondale	110.0	0	110.0	1730	0	1730	118.0	15.40	132.0	5.22
Balclutha	210.0	0	210.0	1770	0	1770	112.0	14.60	126.0	5.82
Blenheim	78.9	0	78.9	1320	0	1320	102.0	13.30	114.0	4.54
Bombay	84.3	0	84.3	1660	0	1660	119.0	15.60	134.0	5.03
Cambridge	87.7	0	87.7	1680	0	1680	128.0	16.70	144.0	5.00
Christchurch	105.0	0	105.0	1340	0	1340	110.0	13.70	117.0	5.02
Cromwell	85.4	0	85.4	1680	0	1680	123.0	16.10	138.0	5.43
Culverden	86.7	0	86.7	1690	0	1690	108.0	14.10	120.0	5.55
Dunedin	119.0	0	119.0	1880	0	1880	115.0	14.50	124.0	5.77
East Tamaki	133.0	0	133.0	1520	0	1520	118.0	15.50	133.0	4.95
Gore	100.0	0	100.0	1550	0	1550	115.0	15.00	129.0	6.02
Greymouth	101.0	0	101.0	1710	0	1710	117.0	15.30	131.0	6.16
Hamilton	99.0	0	99.0	1610	0	1610	125.0	16.30	140.0	5.21
Hutt Valley	113.0	0	113.0	1580	0	1580	128.0	16.70	143.0	5.15
Invercargill	113.0	0	113.0	1630	0	1630	115.0	15.00	129.0	5.02
Levin	101.0	0	101.0	1750	0	1750	110.0	14.30	123.0	5.64
Masterton	86.3	0	86.3	1550	0	1550	117.0	15.20	131.0	5.30
Matamata	95.9	0	95.9	1750	0	1750	126.0	16.40	141.0	5.01
Mosgiel	115.0	0	115.0	1780	0	1780	112.0	14.60	125.0	5.65
Nelson	88.4	0	88.4	1400	0	1400	113.0	14.80	127.0	4.86
New Plymouth	87.1	0	87.1	1700	0	1700	113.0	14.70	126.0	4.84
Normanby	99.3	0	99.3	1760	0	1760	109.0	14.20	122.0	5.55
Otorohanga	139.0	0	139.0	1820	0	1820	124.0	16.20	139.0	5.55
Palmerston North	90.8	0	90.8	1660	0	1660	109.0	14.30	122.0	5.01
Queenstown	97.9	0	97.9	2070	0	2070	127.0	16.60	142.0	5.76
Rangiora	95.7	0	95.7	1510	0	1510	111.0	14.50	124.0	5.40
Rotorua	135.0	0	135.0	2030	0	2030	120.0	15.60	134.0	5.64
Silverdale	113.0	0	113.0	1670	0	1670	121.0	15.80	136.0	5.12
Tairua	103.0	0	103.0	2280	0	2280	126.0	16.50	141.0	5.31
Taupo	95.9	0	95.9	2000	0	2000	110.0	14.40	123.0	5.35
Tauranga	106.0	0	106.0	1540	0	1540	111.0	14.50	125.0	5.08
Timaru	94.7	0	94.7	1470	0	1470	123.0	16.10	138.0	5.64
Waipapa	91.3	0	91.3	1680	0	1680	114.0	14.90	127.0	5.03
Waitara	78.8	0	78.8	1680	0	1680	111.0	14.50	125.0	4.79
Wanaka	93.4	0	93.4	1970	0	1970	125.0	16.30	140.0	5.02
Wellington	95.3	0	95.3	1390	0	1390	116.0	15.20	130.0	4.98
Whakatane	90.4	0	90.4	1980	0	1980	113.0	14.70	126.0	5.38
Whanganui	89.8	0	89.8	1650	0	1650	102.0	13.40	115.0	5.22
Whangarei	111.0	0	111.0	1700	0	1700	117.0	15.30	131.0	5.07
Whitianga	96.8	0	96.8	2070	0	2070	122.0	15.90	136.0	5.26

USE OF RESOURCES

PER 1M³ OF NORMAL READY MIXED CONCRETE

45 MPa Normal Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Ashby's Ready Mixed	102.0	0	102.0	1460	0	1460	123.0	16.00	138.0	4.84
Auckland	142.0	0	142.0	1790	0	1790	130.0	17.00	146.0	5.17
Avondale	115.0	0	115.0	1840	0	1840	134.0	17.50	150.0	5.28
Balclutha	215.0	0	215.0	1870	0	1870	124.0	16.30	139.0	5.88
Blenheim	86.6	0	86.6	1490	0	1490	120.0	15.60	134.0	4.65
Bombay	89.9	0	89.9	1760	0	1760	124.0	16.20	139.0	5.05
Christchurch	111.0	0	111.0	1480	0	1480	122.0	15.90	136.0	5.09
Culverden	93.0	0	93.0	1810	0	1810	124.0	16.20	139.0	5.63
East Tamaki	138.0	0	138.0	1640	0	1640	130.0	17.00	146.0	5.02
Hamilton	102.0	0	102.0	1670	0	1670	133.0	17.40	149.0	5.24
Nelson	92.9	0	92.9	1490	0	1490	121.0	15.80	136.0	4.95
Palmerston North	96.7	0	96.7	1780	0	1780	123.0	16.00	138.0	5.09
Rangiora	99.0	0	99.0	1580	0	1580	120.0	15.60	134.0	5.46
Silverdale	116.0	0	116.0	1730	0	1730	129.0	16.90	145.0	5.18
Tairua	108.0	0	108.0	2380	0	2380	134.0	17.50	150.0	5.40
Waitara	86.9	0	86.9	1860	0	1860	128.0	16.70	143.0	4.97
Wellington	100.0	0	100.0	1500	0	1500	130.0	17.00	146.0	5.02
Whangarei	115.0	0	115.0	1780	0	1780	126.0	16.50	141.0	5.10

USE OF RESOURCES

PER 1M³ OF NORMAL READY MIXED CONCRETE

50 MPa Normal Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Alexandra	97.7	0	97.7	2000	0	2000	147.0	17.30	148.0	5.58
Ashburton	128.0	0	128.0	1770	0	1770	141.0	18.50	158.0	5.12
Ashby's Ready Mixed	108.0	0	108.0	1580	0	1580	136.0	17.30	149.0	4.87
Auckland	147.0	0	147.0	1890	0	1890	142.0	18.50	159.0	5.23
Avondale	120.0	0	120.0	1940	0	1940	142.0	18.60	159.0	5.35
Balclutha	220.0	0	220.0	1980	0	1980	135.0	17.70	151.0	5.96
Blenheim	89.3	0	89.3	1550	0	1550	126.0	16.50	141.0	4.69
Bombay	94.6	0	94.6	1870	0	1870	141.0	18.40	158.0	5.15
Cambridge	93.3	0	93.3	1800	0	1800	135.0	17.70	151.0	5.29
Christchurch	116.0	0	116.0	1570	0	1570	143.0	17.00	146.0	5.12
Culverden	99.4	0	99.4	1940	0	1940	140.0	18.30	157.0	5.70
Dunedin	128.0	0	128.0	2000	0	2000	135.0	17.60	151.0	5.72
East Tamaki	143.0	0	143.0	1740	0	1740	142.0	18.60	159.0	5.07
Hamilton	104.0	0	104.0	1710	0	1710	133.0	17.40	149.0	5.27
Hutt Valley	124.0	0	124.0	1810	0	1810	154.0	20.10	172.0	5.24
Invercargill	119.0	0	119.0	1770	0	1770	125.0	16.30	140.0	5.11
Levin	110.0	0	110.0	1930	0	1930	133.0	17.30	148.0	5.61
Matamata	100.0	0	100.0	1840	0	1840	135.0	17.70	151.0	5.07
Mosgiel	125.0	0	125.0	2030	0	2030	134.0	17.50	150.0	5.74
Nelson	96.9	0	96.9	1580	0	1580	137.0	17.30	148.0	4.97
New Plymouth	99.4	0	99.4	1980	0	1980	135.0	17.70	151.0	5.21
Palmerston North	108.0	0	108.0	1990	0	1990	140.0	18.30	157.0	5.66
Queenstown	103.0	0	103.0	2200	0	2200	155.0	17.70	151.0	5.79
Rangiora	108.0	0	108.0	1750	0	1750	138.0	18.00	154.0	5.56
Silverdale	121.0	0	121.0	1830	0	1830	140.0	18.30	157.0	5.18
Taupo	105.0	0	105.0	2170	0	2170	132.0	17.30	148.0	5.44
Tauranga	114.0	0	114.0	1740	0	1740	134.0	17.50	150.0	5.20
Waipapa	98.3	0	98.3	1810	0	1810	132.0	17.30	148.0	5.14
Waitara	91.1	0	91.1	1950	0	1950	134.0	17.60	151.0	5.07
Wanaka	99.6	0	99.6	2120	0	2120	150.0	17.70	151.0	5.25
Wellington	107.0	0	107.0	1630	0	1630	142.0	18.50	159.0	5.39
Whakatane	101.0	0	101.0	2230	0	2230	132.0	17.30	148.0	5.53
Whangarei	122.0	0	122.0	1910	0	1910	140.0	18.30	157.0	5.23

50 MPa Special Grade

Batching plant name	Renewable primary energy used as energy resource	Renewable primary energy used as raw materials	Total renewable primary energy	Non-renewable primary energy used as energy resource	Non-renewable primary energy used as raw materials	Total non-renewable primary energy	Secondary material	Renewable secondary fuels	Non-renewable secondary fuels	Net fresh water
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Auckland	131.0	0	131.0	1550	0	1550	284.0	13.90	119.0	4.86
Avondale	126.0	0	126.0	1920	0	1920	248.0	13.40	115.0	4.94

WASTE PRODUCTION AND OUTPUT FLOWS

PER 1M³ OF NORMAL READY MIXED CONCRETE

17.5 MPa Normal Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Alexandra	0	2.22	0	0	0	0	66.4
Ashburton	0	2.75	0	0	0.002	0	64.7
Ashby's Ready Mixed	0	2.08	0	0	0.008	0	66.3
Auckland	0	5.58	0	0	0.163	0	72.1
Avondale	0	3.11	0	0	0	0	72.0
Balclutha	0	89.40	0	0	0.009	0	70.8
Blenheim	0	1.25	0	0	0	0	67.5
Bombay	0	3.47	0	0	0	0	71.8
Cambridge	0	3.67	0	0	0	0	81.8
Christchurch	0	2.24	0	0	0	0	59.4
Cromwell	0	3.32	0	0	0	0	68.2
Culverden	0	154	0	0	0	0	65.9
Dunedin	0	4.26	0	0	0	0	68.8
East Tamaki	0	3.54	0	0	0.255	0	72.3
Gore	0	12.4	0	0	0.201	0	63.8
Greymouth	0	4.22	0	0	0	0	68.7
Hamilton	0	2.19	0	0	0	0	79.8
Hutt Valley	0	5.40	0	0	0.388	0	73.0
Invercargill	0	2.28	0	0	0.161	0	63.3
Levin	0	3.21	0	0	0	0	67.7
Masterton	0	1.18	0	0	0	0	69.2
Matamata	0	1.23	0	0	0	0	80.5
Mosgiel	0	0.455	0	0	0	0	68.9
Nelson	0	2.22	0	0	0	0	68.7
New Plymouth	0	3.13	0	0	0.024	0	76.1
Normanby	0	4.25	0	0	0.057	0	65.5
Otorohanga	0	11.8	0	0	0	0	84.1
Palmerston North	0	3.17	0	0	0	0	67.6
Queenstown	0	1.47	0	0	0	0	67.8
Rangiora	0	1.24	0	0	0	0	64.8
Rotorua	0	5.47	0	0	0.076	0	78.6
Silverdale	0	2.20	0	0	0	0	70.7
Tairua	0	3.64	0	0	0.061	0	76.5
Taupo	0	3.21	0	0	0.216	0	67.1
Tauranga	0	4.45	0	0	0.038	0	69.2
Timaru	0	2.13	0	0	0.006	0	66.3
Waipapa	0	3.64	0	0	0	0	71.5
Waitara	0	1.08	0	0	0.009	0	73.1
Wanaka	0	2.11	0	0	0	0	67.9
Wellington	0	28.1	0	0	0	0	73.6
Whakatane	0	4.31	0	0	0	0	71.5
Whanganui	0	20.2	0	0	0.013	0	63.0
Whangarei	0	3.39	0	0	0.005	0	71.9
Whitianga	0	4.10	0	0	0	0	79.3

WASTE PRODUCTION AND OUTPUT FLOWS

PER 1M³ OF NORMAL READY MIXED CONCRETE

20 MPa Normal Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Alexandra	0	2.22	0	0	0	0	74.2
Ashburton	0	2.75	0	0	0.002	0	69.1
Ashby's Ready Mixed	0	2.08	0	0	0.008	0	66.2
Auckland	0	5.59	0	0	0.163	0	75.9
Avondale	0	3.11	0	0	0	0	75.8
Balclutha	0	89.4	0	0	0.009	0	78.8
Blenheim	0	1.25	0	0	0	0	72.5
Bombay	0	3.47	0	0	0	0	75.9
Cambridge	0	3.67	0	0	0	0	86.4
Christchurch	0	2.24	0	0	0	0	66.7
Cromwell	0	3.32	0	0	0	0	74.4
Culverden	0	154	0	0	0	0	69.3
Dunedin	0	4.26	0	0	0	0	75.8
East Tamaki	0	3.54	0	0	0.255	0	75.6
Gore	0	12.40	0	0	0.201	0	68.1
Greymouth	0	4.22	0	0	0	0	71.5
Hamilton	0	2.19	0	0	0	0	86.4
Hutt Valley	0	5.40	0	0	0.388	0	76.0
Invercargill	0	2.28	0	0	0.161	0	65.2
Levin	0	3.21	0	0	0	0	69.1
Masterton	0	1.18	0	0	0	0	71.6
Matamata	0	1.23	0	0	0	0	85.9
Mosgiel	0	0.46	0	0	0	0	75.6
Nelson	0	2.22	0	0	0	0	72.2
New Plymouth	0	3.13	0	0	0.024	0	82.8
Normanby	0	4.25	0	0	0.057	0	69.1
Otorohanga	0	11.80	0	0	0	0	88.5
Palmerston North	0	3.17	0	0	0	0	70.1
Queenstown	0	1.47	0	0	0	0	73.8
Rangiora	0	1.24	0	0	0	0	68.6
Rotorua	0	5.47	0	0	0.076	0	81.3
Silverdale	0	2.20	0	0	0	0	74.9
Tairua	0	3.64	0	0	0.061	0	80.9
Taupo	0	3.21	0	0	0.216	0	73.1
Tauranga	0	4.45	0	0	0.038	0	74.6
Timaru	0	2.13	0	0	0.006	0	69.3
Waipapa	0	3.64	0	0	0	0	73.2
Waitara	0	1.08	0	0	0.009	0	79.7
Wanaka	0	2.11	0	0	0	0	75.3
Wellington	0	28.10	0	0	0	0	75.2
Whakatane	0	4.31	0	0	0	0	75.9
Whanganui	0	20.20	0	0	0.013	0	66.5
Whangarei	0	3.39	0	0	0.005	0	76.0
Whitianga	0	4.10	0	0	0	0	83.7

WASTE PRODUCTION AND OUTPUT FLOWS

PER 1M³ OF NORMAL READY MIXED CONCRETE

25 MPa Normal Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Alexandra	0	2.22	0	0	0	0	81.8
Ashburton	0	2.75	0	0	0.002	0	79.7
Ashby's Ready Mixed	0	2.08	0	0	0.008	0	74.2
Auckland	0	5.59	0	0	0.163	0	84.0
Avondale	0	3.11	0	0	0	0	84.1
Balclutha	0	89.40	0	0	0.009	0	85.9
Blenheim	0	1.26	0	0	0	0	79.9
Bombay	0	3.47	0	0	0	0	84.4
Cambridge	0	3.68	0	0	0	0	94.6
Christchurch	0	2.24	0	0	0	0	73.4
Cromwell	0	3.32	0	0	0	0	85.6
Culverden	0	154.00	0	0	0	0	75.3
Dunedin	0	4.26	0	0	0	0	81.8
East Tamaki	0	3.54	0	0	0.255	0	84.0
Gore	0	12.40	0	0	0.201	0	78.3
Greymouth	0	4.22	0	0	0	0	78.9
Hamilton	0	2.19	0	0	0	0	94.2
Hutt Valley	0	5.40	0	0	0.388	0	88.4
Invercargill	0	2.28	0	0	0.161	0	70.8
Levin	0	3.21	0	0	0	0	78.5
Masterton	0	1.19	0	0	0	0	81.0
Matamata	0	1.23	0	0	0	0	95.2
Mosgiel	0	0.458	0	0	0	0	81.8
Nelson	0	2.22	0	0	0	0	81.9
New Plymouth	0	3.13	0	0	0.024	0	88.9
Normanby	0	4.25	0	0	0.057	0	75.5
Otorohanga	0	11.80	0	0	0	0	101.0
Palmerston North	0	3.18	0	0	0	0	78.5
Queenstown	0	1.47	0	0	0	0	82.8
Rangiora	0	1.24	0	0	0	0	76.2
Rotorua	0	5.48	0	0	0.076	0	90.9
Silverdale	0	2.20	0	0	0	0	85.1
Tairua	0	3.65	0	0	0.061	0	91.4
Taupo	0	3.21	0	0	0.216	0	81.5
Tauranga	0	4.45	0	0	0.038	0	79.5
Timaru	0	2.13	0	0	0.006	0	79.8
Waipapa	0	3.64	0	0	0	0	83.9
Waitara	0	1.08	0	0	0.009	0	87.4
Wanaka	0	2.11	0	0	0	0	75.1
Wellington	0	28.10	0	0	0	0	84.6
Whakatane	0	4.31	0	0	0	0	84.2
Whanganui	0	20.20	0	0	0.013	0	72.6
Whangarei	0	3.40	0	0	0.005	0	84.0
Whitianga	0	4.10	0	0	0	0	93.2

WASTE PRODUCTION AND OUTPUT FLOWS

PER 1M³ OF NORMAL READY MIXED CONCRETE

30 MPa Normal Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Alexandra	0	2.22	0	0	0	0	92.60
Ashburton	0	2.75	0	0	0.002	0	82.90
Ashby's Ready Mixed	0	2.09	0	0	0.008	0	78.60
Auckland	0	5.59	0	0	0.163	0	99.10
Avondale	0	3.12	0	0	0	0	99.20
Balclutha	0	89.40	0	0	0.009	0	92.40
Blenheim	0	1.26	0	0	0	0	89.70
Bombay	0	3.48	0	0	0	0	98.00
Cambridge	0	3.68	0	0	0	0	104.00
Christchurch	0	2.24	0	0	0	0	78.30
Cromwell	0	3.32	0	0	0	0	94.00
Culverden	0	154.00	0	0	0	0	81.30
Dunedin	0	4.26	0	0	0	0	88.90
East Tamaki	0	3.55	0	0	0.255	0	98.30
Gore	0	12.40	0	0	0.201	0	83.00
Greymouth	0	4.23	0	0	0	0	89.80
Hamilton	0	2.19	0	0	0	0	105.00
Hutt Valley	0	5.41	0	0	0.388	0	101.00
Invercargill	0	2.28	0	0	0.161	0	81.30
Levin	0	3.21	0	0	0	0	84.60
Masterton	0	1.19	0	0	0	0	91.20
Matamata	0	1.23	0	0	0	0	104.00
Mosgiel	0	0.459	0	0	0	0	89.00
Nelson	0	2.22	0	0	0	0	88.20
New Plymouth	0	3.13	0	0	0.024	0	98.50
Normanby	0	4.26	0	0	0.057	0	84.70
Otorohanga	0	11.80	0	0	0	0	106.00
Palmerston North	0	3.18	0	0	0	0	87.40
Queenstown	0	1.48	0	0	0	0	90.30
Rangiora	0	1.24	0	0	0	0	83.20
Rotorua	0	5.48	0	0	0.076	0	102.00
Silverdale	0	2.20	0	0	0	0	95.10
Tairua	0	3.65	0	0	0.061	0	101.00
Taupo	0	3.21	0	0	0.216	0	89.20
Tauranga	0	4.45	0	0	0.038	0	91.60
Timaru	0	2.13	0	0	0.006	0	88.70
Waipapa	0	3.64	0	0	0	0	93.40
Waitara	0	1.09	0	0	0.009	0	94.80
Wanaka	0	2.11	0	0	0	0	91.50
Wellington	0	28.10	0	0	0	0	92.60
Whakatane	0	4.31	0	0	0	0	92.50
Whanganui	0	20.20	0	0	0.013	0	80.30
Whangarei	0	3.40	0	0	0.005	0	81.20
Whitianga	0	4.11	0	0	0	0	103.00

WASTE PRODUCTION AND OUTPUT FLOWS

PER 1M³ OF NORMAL READY MIXED CONCRETE

35 MPa Normal Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Alexandra	0	2.23	0	0	0	0	105.00
Ashburton	0	2.76	0	0	0.002	0	95.00
Ashby's Ready Mixed	0	2.09	0	0	0.008	0	88.70
Auckland	0	5.59	0	0	0.163	0	108.00
Avondale	0	3.12	0	0	0	0	108.00
Balclutha	0	89.40	0	0	0.009	0	99.70
Blenheim	0	1.26	0	0	0	0	93.00
Bombay	0	3.48	0	0	0	0	107.00
Cambridge	0	3.68	0	0	0	0	114.00
Christchurch	0	2.24	0	0	0	0	86.80
Cromwell	0	3.32	0	0	0	0	104.00
Culverden	0	154.00	0	0	0	0	93.20
Dunedin	0	4.26	0	0	0	0	96.40
East Tamaki	0	3.55	0	0	0.255	0	108.00
Gore	0	12.40	0	0	0.201	0	97.00
Greymouth	0	4.23	0	0	0	0	100.00
Hamilton	0	2.19	0	0	0	0	114.00
Hutt Valley	0	5.41	0	0	0.388	0	112.00
Invercargill	0	2.29	0	0	0.161	0	90.50
Levin	0	3.22	0	0	0	0	98.40
Matamata	0	1.23	0	0	0	0	112.00
Mosgiel	0	0.46	0	0	0	0	94.90
Nelson	0	2.23	0	0	0	0	98.20
New Plymouth	0	3.14	0	0	0.024	0	107.00
Normanby	0	4.26	0	0	0.057	0	99.40
Otorohanga	0	11.80	0	0	0	0	111.00
Palmerston North	0	3.18	0	0	0	0	99.20
Queenstown	0	1.48	0	0	0	0	105.00
Rangiora	0	1.24	0	0	0	0	92.20
Rotorua	0	5.48	0	0	0.076	0	108.00
Silverdale	0	2.21	0	0	0	0	106.00
Tairua	0	3.65	0	0	0.061	0	114.00
Taupo	0	3.21	0	0	0.216	0	99.20
Tauranga	0	4.45	0	0	0.038	0	101.00
Timaru	0	2.14	0	0	0.006	0	101.00
Waipapa	0	3.65	0	0	0	0	103.00
Waitara	0	1.09	0	0	0.009	0	108.00
Wanaka	0	2.11	0	0	0	0	105.00
Wellington	0	28.10	0	0	0	0	104.00
Whakatane	0	4.32	0	0	0	0	103.00
Whanganui	0	20.20	0	0	0.013	0	88.80
Whangarei	0	3.40	0	0	0.005	0	102.00
Whitianga	0	4.11	0	0	0	0	114.00

WASTE PRODUCTION AND OUTPUT FLOWS

PER 1M³ OF NORMAL READY MIXED CONCRETE

40 MPa Normal Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Alexandra	0	2.23	0	0	0	0	121.00
Ashburton	0	2.76	0	0	0.002	0	111.00
Ashby's Ready Mixed	0	2.09	0	0	0.008	0	104.00
Auckland	0	5.59	0	0	0.163	0	116.00
Avondale	0	3.12	0	0	0	0	115.00
Balclutha	0	89.40	0	0	0.009	0	110.00
Blenheim	0	1.26	0	0	0	0	99.50
Bombay	0	3.48	0	0	0	0	117.00
Cambridge	0	3.68	0	0	0	0	126.00
Christchurch	0	2.25	0	0	0	0	102.00
Cromwell	0	3.33	0	0	0	0	121.00
Culverden	0	154.00	0	0	0	0	105.00
Dunedin	0	4.26	0	0	0	0	109.00
East Tamaki	0	3.55	0	0	0.255	0	116.00
Gore	0	12.40	0	0	0.201	0	113.00
Greymouth	0	4.23	0	0	0	0	115.00
Hamilton	0	2.20	0	0	0	0	122.00
Hutt Valley	0	5.41	0	0	0.388	0	125.00
Invercargill	0	2.29	0	0	0.161	0	113.00
Levin	0	3.22	0	0	0	0	108.00
Masterton	0	1.19	0	0	0	0	114.00
Matamata	0	1.24	0	0	0	0	123.00
Mosgiel	0	0.463	0	0	0	0	110.00
Nelson	0	2.23	0	0	0	0	111.00
New Plymouth	0	3.14	0	0	0.024	0	110.00
Normanby	0	4.26	0	0	0.057	0	106.00
Otorohanga	0	11.80	0	0	0	0	122.00
Palmerston North	0	3.18	0	0	0	0	107.00
Queenstown	0	1.48	0	0	0	0	125.00
Rangiora	0	1.25	0	0	0	0	109.00
Rotorua	0	5.48	0	0	0.076	0	117.00
Silverdale	0	2.21	0	0	0	0	119.00
Tairua	0	3.65	0	0	0.061	0	123.00
Taupo	0	3.22	0	0	0.216	0	108.00
Tauranga	0	4.46	0	0	0.038	0	109.00
Timaru	0	2.14	0	0	0.006	0	121.00
Waipapa	0	3.65	0	0	0	0	112.00
Waitara	0	1.09	0	0	0.009	0	109.00
Wanaka	0	2.12	0	0	0	0	123.00
Wellington	0	28.10	0	0	0	0	114.00
Whakatane	0	4.32	0	0	0	0	111.00
Whanganui	0	20.20	0	0	0.013	0	100.00
Whangarei	0	3.40	0	0	0.005	0	115.00
Whitianga	0	4.11	0	0	0	0	119.00

WASTE PRODUCTION AND OUTPUT FLOWS

PER 1M³ OF NORMAL READY MIXED CONCRETE

45 MPa Normal Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Ashby's Ready Mixed	0	2.09	0	0	0.008	0	120.00
Auckland	0	5.60	0	0	0.163	0	128.00
Avondale	0	3.12	0	0	0	0	131.00
Balclutha	0	89.40	0	0	0.009	0	122.00
Blenheim	0	1.26	0	0	0	0	117.00
Bombay	0	3.48	0	0	0	0	122.00
Christchurch	0	2.25	0	0	0	0	119.00
Culverden	0	154.00	0	0	0	0	122.00
East Tamaki	0	3.55	0	0	0.255	0	128.00
Hamilton	0	2.20	0	0	0	0	131.00
Nelson	0	2.23	0	0	0	0	119.00
Palmerston North	0	3.18	0	0	0	0	120.00
Rangiora	0	1.25	0	0	0	0	117.00
Silverdale	0	2.21	0	0	0	0	127.00
Tairua	0	3.65	0	0	0.061	0	131.00
Waitara	0	1.09	0	0	0.009	0	125.00
Wellington	0	28.10	0	0	0	0	127.00
Whangarei	0	3.40	0	0	0.005	0	123.00

WASTE PRODUCTION AND OUTPUT FLOWS

PER 1M³ OF NORMAL READY MIXED CONCRETE

50 MPa Normal Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Alexandra	0	2.23	0	0	0	0	129.00
Ashburton	0	2.76	0	0	0.002	0	139.00
Ashby's Ready Mixed	0	2.09	0	0	0.008	0	130.00
Auckland	0	5.60	0	0	0.163	0	139.00
Avondale	0	3.12	0	0	0	0	140.00
Balclutha	0	89.40	0	0	0.009	0	133.00
Blenheim	0	1.26	0	0	0	0	123.00
Bombay	0	3.48	0	0	0	0	138.00
Cambridge	0	3.68	0	0	0	0	133.00
Christchurch	0	2.25	0	0	0	0	128.00
Culverden	0	154.00	0	0	0	0	137.00
Dunedin	0	4.27	0	0	0	0	132.00
East Tamaki	0	3.55	0	0	0.255	0	139.00
Hamilton	0	2.20	0	0	0	0	131.00
Hutt Valley	0	5.42	0	0	0.388	0	151.00
Invercargill	0	2.29	0	0	0.161	0	122.00
Levin	0	3.22	0	0	0	0	130.00
Matamata	0	1.24	0	0	0	0	133.00
Mosgiel	0	0.467	0	0	0	0	131.00
Nelson	0	2.23	0	0	0	0	130.00
New Plymouth	0	3.14	0	0	0.024	0	133.00
Palmerston North	0	3.19	0	0	0	0	137.00
Queenstown	0	1.48	0	0	0	0	133.00
Rangiora	0	1.25	0	0	0	0	135.00
Silverdale	0	2.21	0	0	0	0	137.00
Taupo	0	3.22	0	0	0.216	0	130.00
Tauranga	0	4.46	0	0	0.038	0	131.00
Waipapa	0	3.65	0	0	0	0	129.00
Waitara	0	1.09	0	0	0.009	0	132.00
Wanaka	0	2.12	0	0	0	0	133.00
Wellington	0	28.10	0	0	0	0	139.00
Whakatane	0	4.32	0	0	0	0	129.00
Whangarei	0	3.41	0	0	0.005	0	137.00

50 MPa Special Grade

Batching plant name	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy
	kg	kg	kg	kg	kg	kg	MJ
Auckland	0	5.59	0	0	0.163	0	104.00
Avondale	0	3.12	0	0	0	0	101.00

PROGRAMME INFORMATION AND VERIFICATION

Registration No.:	S-P-00555
Date of issue:	08 July 2014
Version date:	03 October 2019
Valid until:	03 October 2024
UN CPC Class:	375 - Concrete, cement and plaster
ANZSIC Class:	2033 - Ready mixed concrete manufacturing
Reference year for data:	2017
Geographical scope:	New Zealand
Version:	1.0

EPD owner:	Allied Concrete Limited Website: www.alliedconcrete.co.nz Contact: Opinder Saggi Phone: 0800 425 543 Email: info@alliedconcrete.co.nz Post: 35 Inglewood Road, Invercargill 981, New Zealand	
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Technical lead & support:	BRANZ Website: www.branz.co.nz Contact: Dr Dave Dowdell Phone: +64 4 237 1174 Email: david.dowdell@branz.co.nz Post: 1222 Moonshine Road, RD1, Porirua 5381, New Zealand	
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Programme operator:	EPD Australasia Ltd Website: www.epd-australasia.com Email: info@epd-australasia.com Post: 315a Hardy Street, Nelson 7010, New Zealand	
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CEN Standard EN 15804 served as the core PCR

Product Category Rules (PCR):	Concrete and concrete elements (EN 16757:2017) - 2012:01-SUB-PCR-G, 2018-11-22 PCR 2012: 01 Construction Products and Construction Services, version 2.3
PCR review was conducted by:	The Technical Committee of the International EPD® System Chair: Massimo Marino. Contact via info@environdec.com
Independent verification of the declaration and data, according to ISO 14025:2006:	<input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier:	Maurizio Fieschi, as individual verifier, qualified by the Technical Committee of the International EPD® System - Organisation: Studio Fieschi & soci Srl - www.studiofieschi.it
Verifier approved by:	EPD Australasia Limited

REFERENCES

- ASTM International; ASTM C469 - Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression; 2014
- ASTM International; ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010
- CEN; EN 15804 + A1 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products; October 2013.
- CEN, Sustainability of construction works – Environmental product declarations – Product Category Rules for concrete and concrete elements (EN 16757:2017) - 2012:01-SUB-PCR-G, 2018-11-22.
- Environmental Protection Authority (New Zealand Government); Construction Products (Corrosive 8.2C) Group Standard; 2010
- EPD® Australasia; Instructions of the Australasian EPD Programme Version 2.0; 2017. www.epd-australasia.com
- International EPD® System; PCR 2012:01 Construction Products and Construction Services, version 2.3, November 2018.
- International EPD® System; General Programme Instructions for the International EPD® System Version 2.5; 2015. www.environdec.com.
- ISO; ISO 14025 Environmental labels and declarations – Type III environmental declarations – principles and procedures; 2006.
- Standards Australia; AS1012.13-1992 – Methods of Testing Concrete – Determination of the drying shrinkage of concrete for samples prepared in the field or in the laboratory; 1992
- Standards Australia; AS1478.1-2000 - Chemical Admixtures for Concrete, Mortar and Grout - Admixtures for Concrete; 2000
- Standards Australia; AS1478.2-2005 - Chemical Admixtures for Concrete, Mortar and Grout – Methods of sampling and testing admixtures for concrete, mortar and grout; 2005
- Standards New Zealand; NZS 3101:2006 – Concrete Structures Standard Part -1 The Design of Concrete Structures; 2006
- Standards New Zealand; NZS 3104:2003 – Specification for Concrete Production; 2003
- Standards New Zealand; NZS 3109:1997 – Concrete Construction; 1997
- Standards New Zealand; NZS 3112.1:1986 – Methods of Test For Concrete – Tests relating to fresh concrete; 1986
- Standards New Zealand; NZS 3112.2:1986 – Methods of Test For Concrete – Tests relating to the determination of strength of concrete; 1986
- Standards New Zealand; NZS 3112.3:1986 – Methods of Test For Concrete – Tests on hardened concrete other than strength; 1986
- Standards New Zealand; NZS 3113:1979 – Specification for Chemical Admixtures of Concrete; 1979
- Standards New Zealand; NZS 3121:1986 – Specification for Water and Aggregate for Concrete; 1986