

Title	Demonstrate knowledge of concrete materials and the concrete production process		
Level	2	Credits	8

Purpose	People credited with this unit standard are able to demonstrate knowledge of: cement, aggregates, water, additives, admixtures, and supplementary cementitious materials, as used in concrete; and the concrete production process.
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Classification	Concrete > Concrete Core Skills
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Available grade	Achieved
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Guidance Information

- Definitions

Additives refers to materials, such as pigments or fibres that are added to the concrete mix.

Admixtures refers to chemicals added to concrete that modify the hardened or plastic properties of concrete (e.g. a set retarder or a water reducer).

Aggregates includes sand or gravel used to make concrete.
- Reference material relevant to this unit standard includes:

New Zealand Guide to Concrete Construction 2011 (Revised Edition) accessed at [NZ Guide To Concrete Construction | PDF | Prestressed Concrete | Beam \(Structure\) \(scribd.com\)](#)

Concrete Production Guide for New Zealand, (Concrete New Zealand), accessed at www.concretenz.org.nz

NZS 3109:1997 *Concrete construction*

NZS 3104:2021 *Specification for concrete production*

NZS 3121:2015 *Water and aggregate for concrete*

NZS 3122:2009 *Specification for Portland and blended cements (General and special purpose)*

AS/NZS and NZS standards are available at <http://www.standards.govt.nz>.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of cement as used in concrete.

Performance criteria

- 1.1 The role of cement as a component of concrete is described.

- 1.2 The five main ingredients of ordinary portland cement are identified, and cement production is described in terms of process.
- 1.3 The purposes of types of cement are described in terms of end use of concrete.
- Range calcium carbonate, silica, aluminium, iron oxide, gypsum.
- 1.4 The transportation and storage of cement is described in terms of maintenance of quality.

Outcome 2

Demonstrate knowledge of aggregates as used in concrete.

Performance criteria

- 2.1 The role of aggregate as a component of concrete is described.
- 2.2 Aggregate properties are described in terms of the aggregate's application in concrete.
- Range size, shape, grading, strength, absorption, basic chemical properties.
- 2.3 Impurities that may be contained in aggregates are described in terms of their potential effect on the concrete.
- Range organic matter, sugar, salt, silt, clay, dust, minerals.

Outcome 3

Demonstrate knowledge of water as used in concrete.

Performance criteria

- 3.1 The role of water in the production of concrete is described.
- 3.2 Contaminants in water are identified and their effects on concrete are described.
- 3.3 The requirement for control of water quality and quantity in concrete mixtures is explained in terms of usability and strength.

Outcome 4

Demonstrate knowledge of additives, admixtures, and supplementary cementitious materials as used in concrete.

Performance criteria

4.1 The purpose and role for types of additives in concrete are described in terms of plastic properties, hardened properties, and/or colour of concrete.

Range glass fibre, steel, high-performance plastic, fibres, pigments.

4.2 The purpose and role for types of admixtures in concrete are described in terms of effect on concrete.

Range air-entraining admixtures (AEA), set-accelerating admixtures, set-retarding admixtures, water-reducing admixtures (WRA), superplasticisers, corrosion inhibitors.

4.3 The purpose and role for types of supplementary cementitious materials in concrete are described in terms of effect on concrete.

Range fly ash, blast furnace slag, silica fume, alternate pozzolans.

Outcome 5

Demonstrate knowledge of the concrete production process.

Performance criteria

5.1 Types of equipment used to mix concrete are described in terms of purpose.

Range batching plant, weighing equipment, central plant mixer, truck-mixer, small-scale production.

5.2 Types of concrete mixes are described in terms of purpose.

Range normal, special, prescribed.

5.3 Concrete production is described in terms of the process.

Range description includes receipt of incoming materials, batch weighting, mixing, transporting.

Planned review date	31 December 2027
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	22 August 2008	31 December 2024
Review	2	24 November 2022	N/A

Consent and Moderation Requirements (CMR) reference	0048
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council qualifications@waihangaararau.nz if you wish to suggest changes to the content of this unit standard.