

Title	Demonstrate knowledge of concrete materials technology		
Level	4	Credits	8

Purpose	People credited with this unit standard are able to demonstrate knowledge of: standards applicable to materials used in concrete production; concrete mix design principles; and tests for concrete and raw materials.
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Classification	Concrete > Concrete Technology
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Available grade	Achieved
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Guidance Information

- Credit for this unit standard indicates compliance with industry practice.
- Definitions**

Industry practice refers to the ability to demonstrate knowledge that reflects the productivity, uniformity, finish quality and material economies currently accepted within industry.

Workplace practice refers to the documented procedures specific to a workplace which set out the standard and required practices of that workplace.
- Publications relevant to this unit standard include:

AS 1478.1-2000 *Chemical admixtures for concrete, mortar and grout – Admixtures for concrete*, available from Standards Association of Australia
<http://www.saigobal.com/shop/Script/search.asp> AS 1478.2-2005 *Chemical admixtures for concrete, mortar and grout*

NZS 3101 Parts 1 and 2:2006 *Concrete structures standard – The design of concrete structures and Commentary on the design of concrete structures*

NZS 3104:2021 *Specification for Concrete Production*

NZS 3109:1997 *Concrete construction*

NZS 3111:1986 *Methods of test for water and aggregate for concrete*

NZS 3112.1:1986 *Methods of test for concrete – tests relating to fresh concrete*

NZS 3121:2015 *Water and aggregate for concrete*

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

NZS 3604:2011 *Timber Framed Buildings*

NZMP 4212:1998 *Glossary of building terminology*, available from Standards New Zealand <http://www.standards.govt.nz>.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of standards applicable to materials used in concrete production.

Performance criteria

- 1.1 Standards applicable to concrete production are identified in terms of their relationship to specific areas of production.
- Range AS 1478.1-2000, NZS 3101, NZS 3104, NZS 3109, NZS 3111, NZS 3112, NZS 3121, NZS 3122, NZS 3604.
- 1.2 Industry terminology is defined in accordance with NZS 3101, NZS 3104, NZS 3109, NZS 3112, and NZS 3604.
- Range compressive strength, flexural and indirect tensile strength, durability, workability, cohesiveness, bleeding, setting time, slump at plant, slump target, slump actual, admixture, agitator, nominal maximum aggregate size, batching plant, sampling representative, sampling snatch, sampling random, sampling selected, compaction, curing.

Outcome 2

Demonstrate knowledge of concrete mix design principles.

Performance criteria

- 2.1 Describe the properties of concrete in accordance with NZS 3112.
- Range properties – plastic, hardened.
- 2.2 Describe the relationship between water:cement ratio and the strength of hardened concrete.
- 2.3 Describe the impact of ratios of materials on properties of the mix.
- 2.4 Describe the purpose, application and effects of admixtures in concrete in accordance with AS 1478.1-2000.
- Range air entrainers, water reducers, set controllers (accelerators and retarders), plasticisers, shrinkage inhibitors.
- 2.5 Describe the relationship between workability and aggregate size and shape in terms of effect on mix design.

- 2.6 Mix proportions for specific concrete applications are described in accordance with workplace practice.

Range standard, structural, block fill, flowable fill, pump, self-compacting, kerb mix, decorative (coloured and exposed aggregate).

Outcome 3

Demonstrate knowledge of tests for concrete and raw materials.

Performance criteria

- 3.1 Describe the methods for testing materials used in the production of concrete in accordance with NZS 3111 to ensure compliance with NZS 3121.
- 3.2 Describe the methods for testing concrete in accordance with NZS 3112.

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	21 May 1999	31 December 2024
Revision	2	12 February 2003	31 December 2024
Review	3	26 July 2004	31 December 2024
Rollover and Revision	4	25 January 2008	31 December 2024
Review	5	11 December 2009	31 December 2024
Review	6	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 Waihangara Ara Rau Construction and Infrastructure Workforce Development Council qualifications@waihangaraarau.nz if you wish to suggest changes to the content of this unit standard.