

Title	Design concrete mixes		
Level	5	Credits	12

Purpose	People credited with this unit standard are able to: describe the specification for concrete mixes; design mixes for normal concrete; design concrete mixes for special purposes; and describe the role of aggregates.
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Classification	Concrete > Concrete Technology
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Available grade	Achieved
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Guidance Information

Legislation and publications relevant to this unit standard include:

Health and Safety in Employment Act 1992;

NZS 3109:1997 *Concrete construction*; NZS 3104:2003 *Specification for concrete production*, and NZS 3101 Parts 1 and 2:1995 *Concrete structures standard – the design of concrete structures*, available from Standards New Zealand

(<http://www.standards.co.nz>).

Outcomes and performance criteria

Outcome 1

Describe the specification for concrete mixes.

Performance criteria

1.1 The specifications for concrete mixes are described in terms of their type.

Range type includes but is not limited to – designed, standard, designated, and prescribed mixes.

1.2 The procedures for checking the compliance of a designed mix are identified in terms of the range of possible actions in the event of non-compliance.

1.3 Statistics are used to establish target strength requirements for concrete mix design.

1.4 Critical areas in specification clauses are identified in terms of their effects on materials and mix selection.

Outcome 2

Design mixes for normal concrete.

Performance criteria

2.1 The characteristics of materials and their proportioning are described in terms of their influence on mix design.

Range characteristics could include but are not limited to – total water, free water, water/cement ratio, strength, margin, target mean strength.

2.2 The factors in batching and mixing that affect the uniformity of concrete are identified in terms of action taken to minimise problems.

Range factors could include but are not limited to – weigh-batching, volume-batching.

2.3 A trial mix of ordinary concrete is designed according to a mix design method.

2.4 The preparation of a laboratory trial mix is described in terms of its assessment and adjustment.

Outcome 3

Design concrete mixes for special purposes.

Performance criteria

3.1 Specified strength concrete mixes are designed for minimum and maximum cement contents, maximum water/cement ratio, air-entrainment, conditions of exposure and sulphates in the ground.

3.2 Factors affecting mix design are identified in terms of design modifications for conditions of construction and use.

Outcome 4

Describe the role of aggregates.

Performance criteria

4.1 The types of natural aggregates are described in terms of production and processing.

4.2 The impurities associated with aggregates are described in terms of their effects on fresh and hardened concrete.

4.3 The properties of lightweight aggregates are described in terms of production methods.

4.4 The types of heavy aggregates are identified in terms of their relative densities.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	23 May 2001	31 December 2023
Revision	2	16 July 2004	31 December 2023
Rollover and Revision	3	25 January 2008	31 December 2023
Rollover and Revision	4	17 November 2011	31 December 2023
Review	5	28 October 2021	31 December 2023

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>.