

<b>Title</b>	<b>Use a nuclear density meter to measure compaction of soils, sands, or gravels</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>5</b>

<b>Purpose</b>	People credited with this unit standard are able to: <ul style="list-style-type: none"> <li>– describe radiation for the purpose of nuclear density meter (NDM) operation;</li> <li>– identify NDM transportation, storage, and record keeping requirements; and</li> <li>– describe and operate an NDM to measure compaction of soils, sands, or gravels.</li> </ul>
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<b>Classification</b>	Infrastructure Works > Infrastructure Civil Works
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<b>Available grade</b>	Achieved
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### Guidance Information

- 1 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with relevant legislative and industry requirements.
- 2 Legislation and standards relevant to this unit standard include:
  - Health and Safety at Work Act 2015;
  - Land Transport Rule: *Dangerous Goods 2005*;
  - NZS 4402.1:1986, *Methods of testing soils for civil engineering purposes – Preliminary and General*;
  - NZS 4407:2015, *Methods of sampling and testing road aggregates*; both available from [www.standards.co.nz](http://www.standards.co.nz);
  - Road Transport of Radioactive Material: *Requirements and Guidance Notes for Drivers and Handlers* (NRL transport brochure); available from [www.health.govt.nz](http://www.health.govt.nz);
  - ISO 9001:2008, *Quality Management Systems – Requirements*;
  - ISO/IEC 17025:2005, *General Requirements for the Competence of Testing and Calibration Laboratories*; available from [www.iso.org](http://www.iso.org);
  - TG3 – *Use of Nuclear Density Meters (NDM) CETANZ Technical Guideline 2017*; available from [www.cetanz.org.nz](http://www.cetanz.org.nz); and all subsequent amendments and replacements.
- 3 Definitions
 

*Handle in SAFE position* refers to the handle being locked.

*Industry requirements* refer to relevant policies, processes, methodologies, industry codes of practice, site specific health and safety plans, standard operating procedures, site safety plans, quality plans, work plans, traffic management plans, contract work programmes, job safety analysis, safe work method statements, job instructions, manufacturer's requirements, contract specifications, manuals, procedural documents.

*Radiation* refers to radioactivity.

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## Outcomes and performance criteria

### Outcome 1

Describe radiation for the purpose of NDM operation.

#### Performance criteria

- 1.1 Radioactive emissions are described in terms of their penetrative power.
- 1.2 Radiation is described in terms of wet density and moisture measurement.
- 1.3 Radiation safety is described in relation to different types of radiation.

Range        alpha, beta, gamma, neutron.

### Outcome 2

Identify NDM transportation, storage, and record keeping requirements.

#### Performance criteria

- 2.1 NDM transportation requirements are identified in accordance with the Dangerous Goods Rule and the NRL transport brochure.
- 2.2 NDM storage requirements are identified in accordance with NRL C15.
- 2.3 NDM record keeping requirements are identified in accordance with NRL C15.

Range        transit logbook, standard count log.

### Outcome 3

Describe and operate a NDM to measure compaction of soils, sands, or gravels.

#### Performance criteria

- 3.1 A NDM is described in terms of components and functions.

Range        probe, keypad, detectors, radioactive sources.

- 3.2 NDM backscatter and direct transmission procedures are described in terms of their uses.
- 3.3 A NDM is set up and a standard count carried out.
- 3.4 Test positions are determined in accordance with job specifications.
- 3.5 Test procedure is carried out at determined positions in accordance with NZS 4402.
- 3.6 Test results are recorded in accordance with NZS 4407:2015.

<b>Planned review date</b>	31 December 2026
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#### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	19 June 2009	31 December 2016
Review	2	19 February 2015	31 December 2023
Review	3	28 October 2021	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0101
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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 Connexis - Infrastructure Industry Training Organisation [qualifications@connexis.org.nz](mailto:qualifications@connexis.org.nz) if you wish to suggest changes to the content of this unit standard.