

<b>Title</b>	<b>Test for gases, interpret findings, and demonstrate knowledge of follow-up actions in a non-coal underground operation</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>15</b>

<b>Purpose</b>	People credited with this unit standard are able to, for a non-coal underground operation: evaluate gas testing requirements; demonstrate the methods and equipment used for testing and interpreting gases and mixtures of gases and describe the potential harm to personnel and the environment; evaluate methods of dispersing gas; and describe evacuation and notification procedures in the case of a gas incident.
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<b>Classification</b>	Extractive Industries > Underground Extraction
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<b>Available grade</b>	Achieved
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<b>Prerequisites</b>	Skill standard 40825; <i>Prepare to work safely in an underground extractive operation</i> , or demonstrate equivalent knowledge and skills.
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## Guidance Information

- Performance of the outcomes of this unit standard must comply with the following:
  - Health and Safety at Work Act 2015 (HSW)
  - Health and Safety at Work (General Risk and Workplace Management) Regulations 2016
  - Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2022
  - Health and Safety at Work (Worker Engagement, Participation, and Representation) Regulations 2016
  - Approved codes of practice issued pursuant to the HSW Act.
  - Workplace exposure standards and biological exposure indices, <https://www.worksafe.govt.nz/topic-and-industry/monitoring/workplace-exposure-standards-and-biological-exposure-indices/>
  - Ventilation in underground mines and tunnels, <https://www.worksafe.govt.nz/topic-and-industry/extractives/mining/ventilation-in-underground-mines-and-tunnels/>.

Any new, amended, or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

- 2 Joint assessment must be conducted in the assessment of this unit standard because of the high degree of risk. To conduct a joint assessment, two assessors, or one assessor and one technical verifier, must have witnessed the learner undertaking the tasks required in the unit standard and have come to the same conclusion in regards to the learner being competent or not yet competent.

At least one assessor or verifier must hold the unit standard they are assessing on their NZQA Record of Achievement.

- 3 Due to the high degree of risk associated with this unit standard, the assessment process must include a learner interview with one or both assessors.
- 4 **Definitions**  
*Company procedures* mean the documented methods for performing work activities and include health and safety, operational, environmental, and quality management requirements. They may refer to legislation, regulations, guidelines, standard operating procedures, manuals, codes of practice, or policy statements.  
*Industry good practice* may be documented in management plans, control plans, company procedures, managers' rules, occupational health and safety policy, industry guidelines, codes of practice, manufacturers' instructions, and safe working and/or job procedures (or equivalent).
- 5 An *underground operation* includes extractive or tunnelling operations.
- 6 This unit standard is intended for, but is not limited to, workplace assessment.
- 7 All evidence for assessment against this unit standard must be in accordance with industry good practice and company procedures.

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## Outcomes and performance criteria

### Outcome 1

Evaluate gas testing requirements in a non-coal underground operation.

#### Performance criteria

- 1.1 Company procedures for testing and the timing of gas testing are evaluated.
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| Range | timings of gas testing include but are not limited to - re-entry, post-abandonment, post-incident, following blasting, loss of ventilation, breakthrough into old workings |
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- 1.2 Required reporting and documentation are described and completed.

### Outcome 2

Demonstrate the methods and equipment used for testing and interpreting gases and mixtures of gases and describe the potential harm to personnel and the environment in a non-coal underground operation.

**Performance criteria**

- 2.1 Critical physical and chemical factors in gases are identified and interpreted in terms of health and safety underground.

Range may include but is not limited to – name, chemical symbol, flammable limits, relative density, occurrence in mines or tunnels, physical properties, physiological effects, legal limits, gases and mixes of gases;  
gases include but are not limited to – carbon monoxide, carbon dioxide, methane, hydrogen, oxygen, nitrogen, sulphur dioxide, hydrogen sulphide, oxides of nitrogen, higher hydrocarbons, ammonia.

- 2.2 Methods for testing for gases or mixes of gases and where they are found related hazards in an underground operation are described.

Range includes but is not limited to – carbon monoxide, carbon dioxide, oxygen, sulphur dioxide, oxides of nitrogen, ammonia.

- 2.3 Use of gas monitoring instruments and systems is demonstrated and described in accordance with manufacturer's specifications.

Range may include but is not limited to – hand-held gas detector, chemical, electronic, remote monitoring.

- 2.4 Results of gas measurements are interpreted in terms of potential hazards that may have consequences for site and personnel.

Range includes but is not limited to – atmospheric pressure, exposure limits, oxygen depleted atmosphere;  
includes but is not limited to measurements for – carbon monoxide, carbon dioxide, oxygen, sulphur dioxide, oxides of nitrogen, ammonia.

- 2.5 Tests and results are documented and reported.

**Outcome 3**

Evaluate methods of dispersing gas in a non-coal underground operation.

Range gases include but are not limited to – carbon monoxide, carbon dioxide, oxygen, sulphur dioxide, oxides of nitrogen, ammonia.

**Performance criteria**

- 3.1 Methods for gas detection, identification, and estimation of volume and concentration are evaluated.

- 3.2 Methods for safely dispersing the gas detected are evaluated.

- 3.3 Tests and results are documented and reported.

## Outcome 4

Describe evacuation and notification procedures in the case of a gas incident in a non-coal underground operation.

### Performance criteria

- 4.1 Procedures in event of evacuation as a consequence of a gas incident are described.
- 4.2 Signalling devices, gas monitoring and detection instrumentation, and alarm systems locations are identified.
- 4.3 Methods of alarm activation are described.
- 4.4 Method of alerting personnel to initial response procedures is described in accordance with trigger action response plans (TARPs).

<b>Planned review date</b>	31 December 2030
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### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	1 March 2018	31 December 2027
Review	2	25 September 2025	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0014
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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 Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council [qualifications@hangaarorau.nz](mailto:qualifications@hangaarorau.nz) if you wish to suggest changes to the content of this unit standard.