

Title	Conduct testing of electrical apparatus in explosive atmospheres installations		
Level	4	Credits	4

Purpose	<p>This unit standard is for electricians who are responsible for conducting testing of electrical, electronic, instrument, and data communication installations for explosive atmospheres.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – demonstrate knowledge of testing installations of explosion-protected apparatus, wiring, and circuits associated with explosive atmospheres – demonstrate knowledge of visible conditions of explosion-protection apparatus that indicate the protection is void, and changes in the nature of the explosion hazard that may render the explosion-protection unsafe – prepare to conduct testing – conduct testing and – confirm and document test results.
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Classification	Explosive Atmospheres > Electrical Apparatus in Explosive Atmospheres - Operations
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Available grade	Achieved
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Guidance Information

- 1 This unit standard has been designed for training and assessment on-job or off-job in a simulated environment which includes explosion-protected apparatus and wiring systems similar to those encountered in a real workplace. It is recommended candidates achieve Unit 26740, *Demonstrate and apply intermediate underpinning knowledge of electrical equipment in explosive atmospheres*, or demonstrate equivalent knowledge and skills, prior to enrolment in this unit standard.
- 2 This unit standard is equivalent to *Conduct testing of hazardous areas installations* in the Australian/New Zealand Standard AS/NZS 4761.1 (version as cited in Electricity (Safety) Regulations) *Competencies for working with electrical equipment for hazardous areas (EEHA) - Competency Standards*.
- 3 This unit standard is intended to be assessed against in conjunction with other work skills related to testing of electrical, electronic, instrument and data communication installations.

- 4 Competence is to be demonstrated in relation to any classified hazardous areas and explosion-protection techniques. Where the competency is demonstrated on wiring/cabling and apparatus that operate at extra low voltage and low voltage, registration with the Electrical Workers Registration Board is required. For work on wiring and apparatus operating above 1000 V AC or 1500 V DC, competency in high voltage work must be held. A copy of a candidate's current practicing license must be presented at the time of assessment.
- 5 References
- AS/NZS 1768:2007, *Lightning protection*
 - AS/NZS 3000 (version as cited in the Electricity (Safety) Regulations), *Electrical installations (known as the Australian/New Zealand Wiring Rules)*
 - AS/NZS 4761.1 (version as cited in the Electricity (Safety) Regulations), *Competencies for working with electrical equipment for hazardous areas (EEHA) – Competency Standards*
 - AS/NZS IEC 60079.10.1:2022, *Explosive atmospheres, Part 10.1: Classification of areas – Explosive gas atmospheres*
 - AS/NZS 60079.14 (version as cited in the Electricity (Safety) Regulations), *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*
 - AS/NZS 60079.17 (version as cited in the Electricity (Safety) Regulations), *Explosive atmospheres – Part 17: Electrical installations inspection and maintenance*
 - AS/NZS 60079.29.2 (version as cited in the Electricity (Safety) Regulations), *Explosive atmospheres – Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen*
 - Electricity Act 1992
 - Electricity (Safety) Regulations 2010
 - Health and Safety at Work Act 2015, and associated regulations
 - *Workplace Exposure Standards and Biological Exposure Indices Edition 13*, available from WorkSafe New Zealand www.worksafe.govt.nz, and associated regulations
- and all subsequent amendments and replacements.
- 6 Definitions
- Appropriate personnel* – individuals with responsibilities for co-ordination, design, installation, maintenance, production, or servicing activities. This can include: site managers, project managers, engineers and technicians, technical experts, line managers or supervisors, regulatory personnel, team leaders, other personnel designated by an organisation or enterprise.
- Established procedures* – formal documented arrangements of an organisation, enterprise or statutory authority in regard to how work is to be done and by whom and may include but are not limited to – quality management systems, safety management systems, work clearance systems, work instructions, reporting systems, and arrangements for dealing with emergencies.
- Explosion-protection techniques* – techniques applied to the design of electrical apparatus, components, and systems to prevent the electrical energy from becoming an ignition source in the presence of flammable vapours and gases or combustible dusts in explosive atmospheres. See *explosion-protected apparatus*.
- Explosion-protected apparatus* – electrical apparatus to which specific measures are applied to avoid ignition of a surrounding explosive atmosphere.

Explosive atmosphere – an atmosphere comprising volatile substances mixed with air under atmospheric conditions in the form of gases, vapours, mist, or dust in which, after ignition has occurred, combustion spreads to the entire unburned mixture.

Hazardous area – area in which an explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation, and use of apparatus.

Verification dossier – a set of documents showing the complete compliance history of electrical apparatus and installations within hazardous areas, as defined in Standards.

7 Range

- a Assessment is to take account of variations between the industry sectors and enterprises. For example, apparatus used in dust-explosive atmospheres will be different in some respects from that used in a petrochemical plant.
- b Health and safety policies and procedures may include but are not limited to – work permits and clearances, hazard monitoring, evacuation procedures, plant and electrical isolation.
- c Established breakdown procedures must be followed.
- d All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with safe working principles and practices, legislation, workplace policies and procedures, Standards, safe and sound practice, and industry practice; and, where appropriate, manufacturers' instructions, specifications, and data sheets.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of testing installations of explosion-protected apparatus, wiring, and circuits associated with explosive atmospheres.

Performance criteria

- 1.1 Describe the preparation for conducting installation testing in an explosive atmosphere.

Range health and safety requirements, procedures for determining whether a given explosive atmosphere is safe to conduct electrical testing.

- 1.2 Describe the characteristics and limitations of testing apparatus used to test installations in explosive atmosphere in terms of the devices required and their suitability.

- 1.3 Describe the documentation of results of explosive atmosphere installation tests.

Range test results to be recorded in a verification dossier; procedures and options for dealing with test results that show non-conformance.

Outcome 2

Demonstrate knowledge of visible conditions of explosion-protection apparatus that indicate the protection is void, and changes in the nature of the explosion hazard that may render the explosion-protection unsafe.

Performance criteria

- 2.1 Describe the visible defects that can be expected in explosion-protected apparatus and wiring.
- 2.2 Identify the conditions that may indicate a change in a given explosion hazard.
- 2.3 Identify the procedures to be followed in the event of a change in the explosion hazard.

Outcome 3

Prepare to conduct testing.

Performance criteria

- 3.1 Ascertain the area classification from the hazardous area layout drawings or other classification documents.
- 3.2 Determine the location of each item of apparatus and of circuits subject to testing from design drawings and documentation.
- 3.3 Obtain the special tools, apparatus, and testing devices needed for the testing work and check for correct operation and safety.

Outcome 4

Conduct testing.

Range testing may include but is not limited to – tests specified by technical and statutory requirements, such as performance and setting of protection devices and systems, earth loop impedance, insulation resistance, earth continuity; tests to verify apparatus connection and operation.

Performance criteria

- 4.1 Store the parts of apparatus that are dismantled in order to conduct testing to protect them against loss or damage.
- 4.2 Select certified and approved low-energy testing devices and use to test in areas where explosive hazards may be present.
- 4.3 Test sensitive circuit components required to be tested that are likely to be damaged by high test voltages, using an appropriate testing method.

- 4.4 Conduct tests necessary to determine whether the installation complies with requirements for the explosion-protection techniques to be used and for electrical safety in accordance with established procedures.
- 4.5 Replace apparatus parts and circuit connections in a manner that ensures the integrity of the explosion-protection system when testing has been completed.

Outcome 5

Confirm and document test results.

Performance criteria

- 5.1 Document non-conformances and faults revealed by the testing and the resulting recommended actions and report to appropriate personnel.

Range defects and faults may include but are not limited to – parameters under test that do not meet statutory requirements; recommended actions may include but are not limited to – non-connection of supply until a defect or fault is rectified, notice of period in which a defect or fault is to be rectified, other actions within the scope of statutory regulations.

- 5.2 Verify completion of testing and submit a copy of the testing documentation to the appropriate personnel for inclusion in the verification dossier in accordance with established procedures.

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	29 August 2000	28 February 2023
Review	2	20 May 2011	31 December 2025
Review	3	2 March 2023	N/A

Consent and Moderation Requirements (CMR) reference	0003
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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.