Title	**Conduct visual and close inspection of electrical installations for explosive atmospheres**		
Level	**4**	**Credits**	**3**

Purpose	This unit standard is intended for use in the training and assessment of people who work with electrical equipment in explosive atmospheres. People credited with this unit standard are able to: – demonstrate knowledge of the purpose and process of visual and close inspections of electrical installations for explosive atmospheres – prepare for and conduct inspection of electrical installations for explosive atmospheres, and – record inspection results.

Classification	Explosive Atmospheres > Electrical Apparatus in Explosive Atmospheres - Compliance

Available grade	Achieved

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 equipment and wiring systems similar to those encountered in a real workplace. It is recommended candidates achieve Unit 26741, *Demonstrate underpinning knowledge of gas detection 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 visual and close inspection of electrical installations for hazardous areas*, in the Australian/New Zealand Standard AS/NZS 4761.1 (version as cited in the Electricity (Safety) Regulations), *Competencies for working with electrical equipment for hazardous areas* (*EEHA*) – *Competency Standards*.

3 Achievement of this unit standard alone does not entitle trainees to legally perform prescribed electrical work without supervision. Until registered and licensed under the Electricity Act 1992, trainees are assisting, and must work under supervision when carrying out prescribed electrical work.

4 Competence shall be demonstrated in relation to any classified explosive atmospheres and explosion-protection technique. 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 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*
- 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 at 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.

Defects – visual damage or corrosion of the explosion-protection aspect of the installation or equipment.

Explosion-protected equipment – electrical equipment to which one or more explosion-protection techniques are applied to avoid ignition of a surrounding explosive atmosphere.

Explosion-protection techniques – techniques applied to the design of electrical equipment, components, and systems to prevent electrical energy from becoming an ignition source in the presence of a surrounding explosive atmosphere, as follows:

For Gas and Vapour Atmospheres

Ex d – flameproof

Ex e – increased safety

Ex i – intrinsic safety; with levels of protection Ex ia, Ex ib, and Ex ic

Ex n – non sparking with levels of protection Ex nA, Ex nC, Ex nL, Ex nR, and Ex nZ;

For dust

Ex iD – intrinsic safety (dusts)

Ex tD – enclosed

Others, less common

Ex p – Pressurisation, with levels of protection Ex pX, Ex pY, and Ex pZ, Ex pD (dust)

Explosive atmosphere – mixture with air, under atmospheric conditions, of flammable substances in the form of gas, vapour, dust, fibres, or flyings which, after ignition, permits self-sustaining propagation.

Hazardous area – a three-dimensional region or space 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 equipment.

Verification dossier – a set of documents showing the complete compliance history of electrical equipment and installations within explosive atmospheres, as defined in Standards.
Visual inspection – inspection which identifies, without the use of access equipment or tools, those defects, such as missing bolts, which will be apparent to the eye.
Wiring system – permitted wiring and accessories for power, measurement, control or communications purposes.

7 Assessment is to take account of variations between the industry sectors and enterprises. For example, equipment used in dust-explosive atmospheres will be different in some respects from that used in a petrochemical plant.

8 On-job assessment
For on-job assessment each candidate shall have access to:
- a safe work methods
- b site inspection schedule
- c inspection reporting system
- d explosion protected electrical installation with and without defects that can be detected by visual and close inspection
- e an assessor.

9 Off-job simulated work environment assessment
For a simulated work environment each candidate shall have access to:
- a safe work methods
- b an area designated as an explosive atmosphere area which is a close facsimile of a real work environment
- c an area entry point
- d delineation of the area into zones for both gas and dust
- e a person to act as the authorised person for the site
- f a qualified supervisor
- g site inspection schedule
- h inspection reporting system
- i explosion protected electrical installation with and without defects that can be detected by visual and close inspection
- j an assessor.

10 Range
- a Established maintenance procedures must be followed.
- b Candidates must refer to current legislation and Standards during assessment.
- c Demonstration of safe working practices and installation in accordance with *safe and sound practice* are essential components of assessment of this unit standard.
- d All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with:
  - i legislation
  - ii workplace policies and procedures
  - iii Standards – may include but are not limited to those listed in Schedule 2 of the Electricity (Safety) Regulations 2010
  - iv applicable site, enterprise, and industry practice, and,
  - v manufacturers' instructions, specifications, and data sheets.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the purpose and process of visual and close inspections of electrical installations for explosive atmospheres.

Performance criteria

1.1 Explain workplace health and safety procedures including procedures to be followed before entering explosive atmospheres, and procedures to be followed while conducting visual and close inspections and equipment isolation.

1.2 Explain the requirements for a verification dossier and the relationship to as-built electrical installation drawings.

1.3 Describe the purpose, scope, and limitations of visual and close inspections and outline the inspection schedules.

Range Ex d, Ex e and Ex n installations; Ex i, Ex iD and Ex nL installations; Ex p and Ex pD; Ex tD.

Outcome 2

Prepare for and conduct inspection of electrical installations for explosive atmospheres.

Performance criteria

2.1 Determine the type and location of each item of equipment subject to inspection from the inspection programme for the site.

2.2 Describe the defects impairing the integrity of the explosion-protection identified during the inspection and explain the potential impact of the defects.

Range defects may include but are not limited to – excessive corrosion; missing cover and mounting bolts, enclosure or cable damage, non-secured cables, exposed armouring/cable cores at glanding points, missing or illegible label, loose or missing fasteners.

2.3 Inspect equipment visually and closely and identify defects impairing the integrity of the type of protection.

Outcome 3

Record inspection results.

Performance criteria

3.1 Record all defects identified by visual and close inspection in accordance with inspection Standards and site record system.

3.2 Forward all documentation in relation to all aspects of the inspection to the appropriate personnel for inclusion in the verification dossier.

Planned review date	31 December 2027

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	29 August 2000	30 June 2012
Review	2	20 May 2011	31 December 2021
Review	3	16 March 2017	31 December 2025
Review	4	2 March 2023	N/A
Consent and Moderation Requirements (CMR) reference			0003

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.