<table>
<thead>
<tr>
<th>Title</th>
<th>Conduct detailed inspection of electrical apparatus installations in explosive atmospheres</th>
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<tbody>
<tr>
<td>Level</td>
<td>5</td>
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<td>Credits</td>
<td>2</td>
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**Purpose**

This unit standard covers the explosion-protection aspects of conducting close and detailed inspections of explosion-protected apparatus and installations. It requires the ability to use a verification dossier, work safely in a hazardous area, inspect against Standards, and report on inspection results.

This unit standard is for electrical inspectors who are responsible for maintenance and/or inspection of plant and apparatus in explosive atmospheres.

People credited with this unit standard are able to:
- demonstrate knowledge of techniques used to inspect installations of explosion-protected and associated apparatus and wiring systems;
- demonstrate knowledge of modifications to explosion-protected apparatus;
- prepare for inspection;
- conduct inspection; and
- report inspection results.

**Classification**

Explosive Atmospheres > Electrical Apparatus in Explosive Atmospheres - Compliance

**Available grade**

Achieved

**Entry information**

**Critical health and safety prerequisites**

Unit 26740, *Demonstrate and apply intermediate underpinning knowledge of electrical equipment in explosive atmospheres*, or demonstrate equivalent knowledge and skills.

Candidates must be an Electrical Inspector holding current registration and a practising license with the Electrical Workers Registration Board (EWRB).

**Recommended skills and knowledge**

Unit 17056, *Install explosion-protected equipment and associated equipment and wiring systems*; or Unit 17058, *Maintain electrical equipment associated with explosive atmospheres*; or Unit 17071, *Plan electrical installations for explosive atmospheres*.
Explanatory notes

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.

2. It is recommended that candidates undertaking this unit standard be working towards achievement of the National Certificate in Electrical Apparatus in Explosive Atmospheres (Level 4) [Ref: 1671].

3. Candidates who achieve this unit standard will be given industry endorsement for explosion-protection techniques relating to one or more of: mining, gases or dusts, depending on which explosion-protection technique competence is demonstrated. The explosion-protection endorsements are as follows:

<table>
<thead>
<tr>
<th>Unit endorsement suffix</th>
<th>Competence demonstrated</th>
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<tbody>
<tr>
<td>Ex ‘d’</td>
<td>Flameproof</td>
</tr>
<tr>
<td>Ex ‘e’</td>
<td>Increased safety</td>
</tr>
<tr>
<td>Ex ‘n’</td>
<td>Non-sparking</td>
</tr>
<tr>
<td>Ex ‘i’</td>
<td>Intrinsic safety</td>
</tr>
<tr>
<td>Ex ‘p’</td>
<td>Pressurization</td>
</tr>
<tr>
<td>Ex ‘tD’ (DIP)</td>
<td>Protection by enclosure – dusts</td>
</tr>
<tr>
<td>‘I’</td>
<td>Group I apparatus only</td>
</tr>
<tr>
<td>‘Gases’</td>
<td>Gas hazards only</td>
</tr>
<tr>
<td>‘Dusts’</td>
<td>Dust hazards only</td>
</tr>
<tr>
<td>‘ELV’</td>
<td>For apparatus and systems operating at extra-low voltage</td>
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</table>

For further detail about the explosion-protection endorsements, please contact ETITO at [http://www.etito.co.nz](http://www.etito.co.nz).

4. This unit standard is directly equivalent to Unit 2.12 Conduct detailed inspection of hazardous areas installations in the Australian/New Zealand Standard AS/NZS 4761.1:2008 Competencies for working with electrical equipment in hazardous areas (EEHA) Part 1: Competency standards and includes essential skills and knowledge identified within the relevant clauses. It aligns with Australian Competency Standards UEEEEM043A, UEEEEM044A, UEEEEM045A and UEEEEM046A from UEE07 Electrotechnology Training Package Version 3.1 (copyright Australian National Training Information Service).

5. This unit standard is intended to be assessed against in conjunction with other work skills related to inspection of electrical work.
6 Competence is to be demonstrated in relation to any classified hazardous areas and explosion-protection techniques. Competencies can be demonstrated for circuits operating at extra low voltage. Where the competency is demonstrated on wiring/cabling and apparatus that operate at voltages below 1000 V a.c. or 1500 V d.c., registration with the Electrical Workers Registration Board is required. For work on wiring and apparatus operating above 1000 V a.c. or 1500 V d.c., 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.

7 References
AS/NZS 1768:2007, Lightning protection;
AS/NZS 3000:2007, Electrical installations (known as the Australian/New Zealand Wiring Rules);
AS/NZS 4761.1:2008, Competencies for working with electrical equipment for hazardous areas (EEHA) Part 1 – Competency Standards;
AS/NZS 60079.10.1:2009, Explosive atmospheres – Classification of areas – Explosive gas atmospheres;
AS/NZS 60079.14:2009, Explosive atmospheres – Electrical installations design, selection and erection;
AS/NZS 60079.17:2009, Explosive atmospheres – Electrical installations inspection and maintenance;
AS/NZS 60079.29.2.2008, Explosive atmospheres – Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen;
AS/NZS 61241.0:2005, Electrical apparatus for use in the presence of combustible dust – General requirements;
AS/NZS 61241.2.1:2000, Electrical apparatus for use in the presence of combustible dust – Test methods – Methods for determining the minimum ignition temperature of dust;
Electricity Act 1992;
Electricity (Safety) Regulations 2010;
Hazardous Substances and New Organisms Act 1996;
Health and Safety in Employment Act 1992, and associated regulations;
New Zealand Electrical Codes of Practice (NZECP), ISSN 0114-0663 (available from the Ministry of Economic Development);
Standards Australia HB13 – Electrical equipment for hazardous areas;
and all subsequent amendments and replacements.

8 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.
Competent person – a person who can demonstrate a combination of knowledge and skills to effectively, efficiently and safely carry out activities in explosive atmospheres,
covered by AS/NZS 4761. Competency in some cases may be limited to one or more specific types of explosion-protection technique, e.g. Ex ‘d’, Ex ‘i’, and/or activity e.g. design, selection, installation, maintenance, testing, and inspection. 

*Detailed inspection* – aspects covered by a visual inspection and, in addition, identifies those defects, such as loose terminations, which will be apparent by opening the enclosure, and/or using, where necessary, tools and test apparatus; 

*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. Such apparatus employs one or more of the following explosion-protection techniques: 

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; 

For dusts
- Ex iD – intrinsic safety (dusts); 
- Ex tD – enclosed; 

Others, less common
- Ex p – pressurisation; Ex pD (dust); 
- Ex m – encapsulation, with levels of protection Ex ma, Ex mb, Ex mc (gases and vapours), and Ex mD (dusts); 
- Ex s – special protection; categorised by Zone of application; e.g. ‘Ex s (Zone 0); 
- Ex o – oil immersion; 
- Ex q – sand filled; 
- Ex v – ventilation. 

*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. 

*Inspection* – scrutiny with or without partial dismantling, and if necessary, measurement to reach a conclusion on the condition of the apparatus. There are various types and grades of inspection.

*Integrity of explosion-protected apparatus* – the condition of being unified, complete or sound in construction of the apparatus design and use that ensures explosion-protection. e.g. the structural integrity of the apparatus. 

*Registered workshop* – one that is certified under the Australian/New Zealand Certification Scheme for explosion-protected electrical apparatus (ANZEx Scheme) Recognised Service Facilities Program.
Requirements – those to which apparatus, procedures and their outcomes have to conform and include statutory obligations and regulations and Standards called up by legislation or regulations.
Verification dossier – a set of documents showing the complete compliance history of electrical apparatus and installations within hazardous areas, as defined in Standards.
Visual inspection – inspection which identifies, without the use of access apparatus 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.

9 Range
a Assessment is to take account of variations between the industry sectors and enterprises. For example, apparatus used in underground coal mining will be different in some respects from that used in a petrochemical plant.
b Occupational Safety and Health (OSH) policies and procedures may include but are not limited to – work permits and clearances, hazard monitoring, evacuation procedures, plant and electrical isolation.
c The application of contingency management skills must be demonstrated for all outcomes and evidence requirements.
d Established maintenance procedures must be followed.
e All activities and evidence presented for all outcomes and evidence requirements in this unit standard must be in accordance with safe working principles and practices, legislation, policies, procedures, ethical codes and Standards, safe and sound practice, and industry practice; and, where appropriate, manufacturers’ instructions, specifications, and data sheets.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of techniques used to inspect installations of explosion-protected and associated apparatus and wiring systems.

Evidence requirements

1.1 The relationship between the documentation held in a verification dossier and the installed apparatus is described.

Range consistency between the location and type of apparatus with the area classification details in the verification dossier, apparatus certification and any attached conditions that relate to the apparatus as it is installed.

1.2 Grades of inspection and how and when they should be applied are explained.

Range close, detailed, visual.

1.3 Requirements for the inspection of a hazardous area installation are explained.

Range inspection processes, requirements applicable to a given installation, inspection report.
Outcome 2
Demonstrate knowledge of modifications to explosion-protected apparatus.

Evidence requirements

2.1 The scope and limitations for design and development of permitted modifications of explosion-protected apparatus are described.

2.2 The requirements of a competent person for a registered workshop engaged in design and development of modifications to explosion-protected apparatus is explained.

2.3 The requirements for identifying and documenting modified explosion-protected apparatus are described.

Range modification report document, requirements for distribution of reports on modifications.

Outcome 3
Prepare for inspection.

Evidence requirements

3.1 Type and grade of inspection is ascertained from the inspection schedule retained in the verification dossier.

3.2 Area classification is ascertained from hazardous areas layout drawings retained in the verification dossier.

3.3 Type and intended location of each item of apparatus and circuits subject to inspection are determined from design drawings and documentation.

3.4 Special tools, apparatus, and devices needed for the inspection are obtained and checked for correct operation and safety.

Outcome 4
Conduct inspection.

Evidence requirements

4.1 Where applicable, an appropriately qualified person is directed to access apparatus to facilitate the inspection.

4.2 Parts of apparatus that are dismantled in order to conduct inspection are stored to protect them against loss or damage.
4.3 Apparatus, systems, and installation are inspected for compliance with the design specifications retained in the verification dossier and in accordance with requirements.

4.4 Where applicable, after the inspection of each item, apparatus parts and circuit connections are replaced in a manner that ensures the integrity of the explosion-protection system.

Outcome 5

Report inspection results.

Evidence requirements

5.1 Any non-conformances, faults, or unauthorised modifications are documented in accordance with established procedures.

5.2 Where applicable, a non-conformance report, including the actions taken and a statement on whether circuits have been re-energised, is made and forwarded to the appropriate personnel.

5.3 Documentation in relation to all aspects of the inspection is forwarded to the appropriate personnel for inclusion in the verification dossier in accordance with requirements.

<table>
<thead>
<tr>
<th>Replacement information</th>
<th>This unit standard was replaced by unit standard 30071.</th>
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This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

<table>
<thead>
<tr>
<th>Status information and last date for assessment for superseded versions</th>
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<tr>
<td>Process</td>
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<td>Registration</td>
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<td>Review</td>
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Consent and Moderation Requirements (CMR) reference 0003


Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.
Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMRs). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.