

<b>Title</b>	<b>Determine the explosion-protection requirements specified for classified explosive atmospheres</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>5</b>

<b>Purpose</b>	<p>This unit standard is intended for use in the training and assessment of people who work with electrical equipment in explosive atmospheres. This unit standard covers the requirements for the types of explosion-protected equipment for a given explosive atmospheres site.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– prepare to review explosion-protected technical Standards;</li> <li>– ascertain the requirements for each explosion-protection type; and</li> <li>– identify acceptable equipment certification for a given site.</li> </ul>
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<b>Classification</b>	Explosive Atmospheres > Electrical Apparatus in Explosive Atmospheres - Operations
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<b>Available grade</b>	Achieved
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<b>Entry information</b>	
<b>Critical health and safety prerequisites</b>	Unit 26740, <i>Demonstrate and apply intermediate underpinning knowledge of electrical equipment in explosive atmospheres</i> , or demonstrate equivalent knowledge and skills.

**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 equipment and wiring systems similar to those encountered in a real workplace.
- 2 This unit standard is directly equivalent to Clause 2.4, *Determine the explosion protection requirements specified for a classified hazardous area*, in the Australian/New Zealand Standard AS/NZS 4761:2017 *Competencies for working with electrical equipment in hazardous areas (EEHA)* and covers the practice component. Please refer to unit standard 26739, *Demonstrate introductory underpinning knowledge of electrical apparatus in explosive atmospheres*, for the theoretical component.

- 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 References  
AS/NZS 1768:2007, *Lightning protection*;  
AS/NZS 3000:2007 *Electrical installations (known as the Australian/New Zealand Wiring Rules)*;  
AS/NZS 4761:2017 *Competencies for working with electrical equipment in hazardous areas (EEHA)* – pending publication;  
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*;  
Electricity Act 1992;  
Electricity (Safety) Regulations 2010;  
Hazardous Substances and New Organisms Act 1996;  
Health and Safety at Work Act 2015, and associated regulations;  
and their subsequent amendments and replacements.
- 5 Definitions  
*ANZEx* – Australian/New Zealand Certification Scheme for explosion-protected electrical apparatus (ANZEx Scheme).  
*ATEX* – Appareils destinés à être utilisés en Atmosphères Explosibles, comprises two European Union directives (Directive 94/9/EC) that describe what apparatus, protective systems, and work that is permitted in potentially explosive atmospheres.  
*Certification documentation* – document(s) that assure(s) the conformity of a product, process, system, person, or organisation with specified requirements.  
*EPL* – equipment protection levels.  
*Equipment group* – Group I is for equipment for underground mines. Group II is for gases and vapours in surface industries, and is divided into Groups IIA, IIB and IIC for substances with increasing ease of ignition. Group III is for dusts in surface industries, and is similarly divided into Groups IIIA, IIIB and IIIC. These are added as roman number suffixes to explosion-protection technique markings on equipment and on Certificates of Compliance.  
*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);

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; for example; Ex s (Zone 0);

Ex o – oil immersion;

Ex op – optical radiation;

Ex q – sand filled;

Ex v – ventilation.

*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.

*IECEX* – International Electrotechnical Commission certification scheme covering product that meets the requirements of International Standards.

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

*LEL* – lower explosive limit – the concentration of flammable gas, vapour, or dust in air below which, an explosive atmosphere will not be formed.

*Mixed explosion-protection* – equipment that comprises several components, each with its own explosion-protection technique, contained within the one enclosure.

*Safe and sound practice* – as it relates to the installation of electrical equipment is defined in AS/NZS 3000:2007, *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*.

*Temperature class* – classification system of electrical equipment, based on its maximum surface temperature, related to the specific explosive atmosphere for which it is intended to be used.

*UEL* – upper explosive limit – the concentration of flammable gas, vapour, or dust in air above which, an explosive atmosphere will not be formed.

*Verification dossier* – a set of documents showing the complete compliance history of electrical equipment and installations within explosive atmospheres, as defined in Standards.

- 6 Assessment is to take account of variations between the industry sectors and enterprises. For example, equipment used in underground mining will be different in some respects from that used in a petrochemical plant.
- 7 On-job assessment  
For on-job assessment each candidate shall have access to:
- a plan of the site showing delineation of classified zones
  - b list of signage used on the site
  - c limitations of devices and equipment that may be taken into the area
  - d limitations of work that may be undertaken in the area
  - e procedures and instruction in the case of an emergency
  - f an entry and clearance-to-work system
  - g examples of typical devices and equipment (compliant and non-compliant) that a person may take into a explosive atmosphere area, this may include cellular phones, testing devices and equipment, and tools

- h an assessor.
- 8 Off-job simulated work environment assessment  
For a simulated work environment each candidate shall have access to:
- a an area designated as a explosive atmosphere, which is a close facsimile of a real work environment
  - b an area entry point
  - c 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 an assessor.
- 9 Range
- a Candidates must refer to current legislation and Standards during assessment.
  - b Demonstration of safe working practices and installation in accordance with *safe and sound practice* are essential components of assessment of this unit standard.
  - c All activities and evidence presented for all outcomes and evidence requirements in this unit standard must be in accordance with:
    - i legislation;
    - ii policies and procedures;
    - iii ethical codes;
    - iv Standards – may include but are not limited to those listed in Schedule 2 of the Electricity (Safety) Regulations 2010;
    - v applicable site, enterprise, and industry practice; and,
    - vi manufacturers' instructions, specifications, and data sheets.

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## Outcomes and evidence requirements

### Outcome 1

Prepare to review explosion-protected technical Standards.

#### Evidence requirements

- 1.1 Identify the technical Standards specifying the requirements to which each type of explosion-protected equipment shall comply.
- 1.2 Review a verification dossier for a site that has gas hazards and establish the requirements for the explosive atmospheres.
- 1.3 Review a verification dossier for a site that has dust hazards and establish the requirements for the explosive atmospheres.

### Outcome 2

Ascertain the requirements for each explosion-protection type.

Range exclusion, explosion containment, avoidance of ignition source, dilution, ventilation.

**Evidence requirements**

- 2.1 Explain explosion-protection methods for different equipment types and describe their protective features and principle of operation.
- 2.2 Review the equipment Standards to establish the compliance requirements of each equipment type.
- 2.3 Describe aspects that can void the protection of explosion-protection equipment due to defective installation or poor maintenance for different equipment types and equipment Standards.
- 2.4 Examine items of explosion-protected equipment to identify any condition that would void the protection.
- Range Ex d, Ex e, Ex i.
- 2.5 Use technical Standards, equipment certification, and the verification dossier for a given site to establish where particular explosion-protected equipment types may be used.

**Outcome 3**

Identify acceptable equipment certification for a given site.

**Evidence requirements**

- 3.1 Use equipment certification process and acceptable Standards to identify acceptable equipment certification.
- 3.2 Obtain the required marking on certified equipment from relevant technical Standards.
- 3.3 Establish the suitability of explosion-protection equipment items for a given application and location from relevant technical Standards, certification documents, equipment marking, and the verification dossier for a given site.

<b>Planned review date</b>	31 December 2021
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**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	16 March 2017	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

**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 (CMR). 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.

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### **Comments on this unit standard**

Please contact The Skills Organisation [reviewcomments@skills.org.nz](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.