

Title	Assess the fitness-for-purpose of explosive atmospheres legacy explosion-protected apparatus		
Level	6	Credits	8

Purpose	<p>This unit standard covers the explosion-protection aspects of permanently installed legacy explosion-protected apparatus that has no acceptable certification and a conformity assessment document cannot be prepared to determine the level of conformity with current IEC or AS/NZS Standards. It requires the ability to gather, establish, and evaluate technical information on relevant explosion-protection techniques and to report evaluations and findings, including recommendations based on safety requirements and economic considerations.</p> <p>This unit standard is for engineers who are responsible for safety, maintenance, engineering design, and management functions associated with electrical apparatus in explosive atmospheres.</p> <p>This unit standard is intended for the assessment of people who are responsible for considering the use and refurbishment of legacy plant and the selection of repaired or overhauled apparatus.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> • demonstrate knowledge of techniques used when inspecting installations of explosion-protected and associated apparatus and explosive atmospheres wiring; • demonstrate knowledge of processes used when auditing explosive atmospheres; • prepare to assess fitness-for-purpose of apparatus and systems; • gather technical information to assess fitness-for-purpose of apparatus and systems; • assess apparatus and/or systems against Standards; and • develop and submit a fitness-for-purpose report.
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Classification	Explosive Atmospheres > Electrical Apparatus in Explosive Atmospheres - Compliance
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Available grade	Achieved
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Prerequisites	Unit 26740, <i>Demonstrate and apply intermediate underpinning knowledge of electrical apparatus in explosive atmospheres</i> ; Unit 17068, <i>Conduct a conformity assessment of explosion-protected apparatus</i> ; and Unit 24980, <i>Perform compliance audits of explosive atmospheres and the related electrical installation</i> ; or demonstrate equivalent knowledge and skills.
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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.
- 2 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:

Unit endorsement suffix Competence demonstrated

Ex 'd'	Flameproof
Ex 'e'	Increased safety
Ex 'n'	Non-sparking
Ex 'i'	Intrinsic safety
Ex 'p'	Pressurization
Ex 'tD' (DIP)	Protection by enclosure – dusts
'I'	Group I apparatus only
'Gases'	Gas hazards only
'Dusts'	Dust hazards only
'ELV'	For apparatus and systems operating at extra-low voltage.

For further detail about the explosion-protection endorsements, please contact ETITO at <http://www.etito.co.nz>.

- 3 This unit standard is directly equivalent to Unit 2.22 *Assess the fitness-for-purpose of hazardous areas explosion-protected equipment* 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 as specified in the relevant clauses. It aligns with Australian Competency Standards *UEENEEM067A*, *UEENEEM068A* and *UEENEEM069A* from UEE07 Electrotechnology Training Package Version 3.1 (copyright Australian National Training Information Service).
- 4 This unit standard is intended to be assessed against in conjunction with other work skills related to safety, maintenance, engineering design, and management of electrical installations.
- 5 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 4761.2:2008, *Competencies for working with electrical equipment for hazardous areas (EEHA) Part 2 – Guide to assessing competency*;
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 61241.14:2005, *Electrical apparatus for use in the presence of combustible dust – Selection and installation*;
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;
Standards Australia HB13-2007, *Electrical equipment for hazardous areas; Workplace Exposure Standards and Biological Exposure Indices*, available from the Department of Labour, <http://www.osh.govt.nz/order/catalogue/329.shtml>, and associated regulations;
and their subsequent amendments and replacements.

6 Definitions

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.

The term *equipment* includes *apparatus*, as mentioned in many relevant Standards.

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.

IEC – International Electrotechnical Commission – a standard setting body for the safety of electrical apparatus including that which is used in explosive atmospheres.

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.

Wiring system – permitted wiring and accessories for power, measurement, control or communications purposes.

7 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 performance criteria 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 performance criteria

Outcome 1

Demonstrate knowledge of techniques used when inspecting installations of explosion-protected and associated apparatus and explosive atmospheres wiring.

Performance criteria

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 detailed in the verification dossier, apparatus certification and any attached conditions that relate to the apparatus as it is installed.

1.2 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 processes used when auditing explosive atmospheres.

Performance criteria

2.1 Requirements to retain explosive atmospheres documentation on site are explained.

2.2 Components of an audit are identified.

Range authenticity of documentation, explosive atmospheres delineations shown in site diagrams, location and operating parameters of apparatus shown in certification documents, compliance of apparatus location, compliance of wiring systems, alignment of explosive atmospheres documentation to as-built installation.

2.3 Requirements for reporting non-conformance of an installation are explained.

Outcome 3

Prepare to assess fitness-for-purpose of apparatus and systems.

Performance criteria

3.1 Apparatus or system to be assessed is ascertained from instructions and in consultation with appropriate personnel.

3.2 Available design documentation in accordance with established procedures is obtained from site records or apparatus or system manufacturer.

3.3 Authenticity of documentation is verified with the issuing organisation or the assessor.

3.4 Standards and codes of practice against which apparatus or systems are to be assessed are identified, obtained and explained.

- 3.5 Where design documentation is unavailable arrangements are made to establish the specification of the apparatus to determine the normal operating and performance parameters of the apparatus or system.
- 3.6 Special tools, apparatus, and testing devices needed to carry out field testing/measurements are obtained and checked for correct operation and safety.

Outcome 4

Gather technical information to assess fitness-for-purpose of apparatus and systems.

Performance criteria

- 4.1 Where necessary tests and/or measurements are carried out to verify the specification for the apparatus or system.
- 4.2 Assessment of the apparatus or system is made to gather data relevant to the specification and verified according to the appropriate Standards and codes of practice.

Outcome 5

Assess apparatus and/or systems against Standards.

Performance criteria

- 5.1 Apparatus or system design details are assessed for compliance with each relevant clause in the appropriate Standard. Examination is set up in accordance with established procedures.
- Range apparatus or system assessment includes calculations, measurements, design specifications.
- 5.2 Differences between apparatus and Standards requirements are identified and documented.
- 5.3 Recommendations are developed as to whether remedial work is viable for apparatus or systems that are initially assessed as not being fit-for-purpose.
- 5.4 Specifications recommending remedial work are developed for systems or apparatus identified as not-fit-for-purpose.

Outcome 6

Develop and submit a fitness-for-purpose report.

Performance criteria

- 6.1 Assessment results pertaining to the integrity of explosion-protected electrical apparatus are documented in a fitness-for-purpose report in accordance with requirements and established procedures.

- 6.2 Fitness-for-purpose report and all required appended documentation are forwarded in accordance with requirements and established procedures and recorded in the verification dossier.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 May 2011	31 December 2024
Review	2	2 March 2023	31 December 2024

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>.