

Title	Perform compliance audits of explosive atmospheres and the related electrical installation		
Level	6	Credits	3

Purpose	<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 compliance audits of installations with explosion-protection equipment. It requires the ability to verify whether an installation complies with the relevant explosive atmospheres Standards for that installation. It includes the verification of design and certification documentation (verification dossier), maintenance, overhaul and repair, work safety, inspection against Standards, and reporting of audit results.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – demonstrate knowledge of processes used when auditing explosive atmospheres; – prepare for the audit and establish extent of the audit; – perform audit; and – report audit results.
----------------	---

Classification	Explosive Atmospheres > Electrical Apparatus in Explosive Atmospheres - Compliance
-----------------------	--

Available grade	Achieved
------------------------	----------

Prerequisites	Unit 17070, <i>Develop and manage electrical inspection and maintenance programmes for explosive atmospheres</i> , or demonstrate equivalent knowledge and skills.
----------------------	--

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.
- 2 This unit standard is directly equivalent to Clause 2.14, *Perform compliance audits of hazardous areas and the related electrical installation*, in the Australian/New Zealand Standard AS/NZS 4761:2017 *Competencies for working with electrical equipment in hazardous areas (EEHA)*.

- 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 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'	Protection by enclosure – dusts
'I'	Group I equipment only
'Gases'	Gas hazards only
'Dusts'	Dust hazards only
'ELV'	For equipment and systems operating at extra-low voltage.

- 5 This unit standard is intended to be assessed against in conjunction with other work skills related to quality assurance and auditing of an electrical installation.
- 6 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;
New Zealand Electrical Codes of Practice (NZECP), ISSN 0114-0663 (available from the Ministry of Economic Development);
 Standards Australia HB13-2007, *Electrical equipment for hazardous areas; Workplace Exposure Standards and Biological Exposure Indices*, June 2016, (available from WorkSafe New Zealand at <http://www.worksafe.govt.nz/worksafe/information-guidance/all-guidance-items/workplace-exposure-standards-and-biological-exposure-indices/workplace-exposure-standards-and-biological-indices-2016.pdf>), and associated regulations; and all subsequent amendments and replacements.
- 7 Definitions
 ANZEx – Australian/New Zealand Certification Scheme for explosion-protected electrical apparatus (ANZEx Scheme).

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.

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.

Competent person – a person who can demonstrate a combination of knowledge and skills to effectively, efficiently, and safely carry out activities in hazardous areas covered by AS/NZS 4761:2017 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.

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.

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.

8 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.

9 Range

a The application of contingency management skills must be demonstrated for all outcomes and evidence requirements.

b Established maintenance procedures must be followed.

c Candidates must refer to current legislation and Standards during assessment.

d Demonstration of safe working practices and installation in accordance with *safe and sound practice* are essential components of assessment of this unit standard.

e All activities and evidence presented for all outcomes and performance criteria 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.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of processes used when auditing explosive atmospheres.

Performance criteria

- 1.1 Explain the requirements to retain the explosive atmospheres verification dossier on site.
- 1.2 Explain requirements for reporting installation non-conformance.

Outcome 2

Prepare for and establish the extent of the audit.

Performance criteria

- 2.1 Obtain and explain site health and safety policies and procedures for working in the given hazardous area.
- 2.2 Review the verification dossier to verify that essential explosive atmospheres documentation is retained and procedures for maintaining records are established.
- 2.3 Describe the hazardous area classification processes as applied to auditing the classification and design documentation and explain the procedures to follow to verify traceability and authentication.
- 2.4 Consult responsible plant personnel to ascertain details of any alterations or modifications to the plant or processes.
- 2.5 Use design drawings and documentation including as-built documentation to determine the type and intended location of each item of equipment and routes of wiring systems that are subject to the audit.
- 2.6 Obtain compliant tools, equipment, and testing devices needed for the audit and check them for correct operation and safety.

Outcome 3

Perform audit.

Performance criteria

- 3.1 Examine the area classification documentation to ensure compliance of process, traceability, and relevance to the current plant and processes.
- 3.2 Assess the electrical design documents for the installation to ensure compliance with the relevant standards and as-installed documentation.

- 3.3 Assess the certification documentation and any repair, overhaul, or compliance assessment records for items of explosion protected equipment to ensure compliance with requirements of the current plant and processes.
- 3.4 Direct authorised personnel to open equipment enclosures as required for the audit and on completion ensure the integrity of explosion protection is restored.
- 3.5 Audit the electrical equipment and installation for conformance with the design as-installed specifications and compliance with the requirements of applicable Standards.
- 3.6 Evaluate and assess inspection and maintenance records against the condition of the plant and for compliance with requirements.

Outcome 4

Report audit results.

Performance criteria

- 4.1 Report differences between the explosive atmospheres verification dossier, the as-installed drawings, the design specifications, and the installation.
- 4.2 Prepare an audit report that documents deficiencies and inaccuracies in site record, and non-conformance of the explosion protected equipment and the installation, and include recommendations for their correction.
- 4.3 Forward the audit report to the person who is responsible for acting on the recommendation and for maintaining the explosive atmospheres documentation and 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 2021
Review	2	16 March 2017	31 December 2024
Review	3	2 March 2023	31 December 2024

Consent and Moderation Requirements (CMR) reference	0003
--	------

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.