

Title	Establish, arrange and verify overhaul and repair of explosion-protected apparatus		
Level	5	Credits	5

Purpose	<p>This unit standard covers the explosion-protection aspects of overhauling and repairing explosion-protected apparatus and the activities required of the responsible person. It requires the ability to establish and document the level of work required, to arrange for the overhaul and repair to be carried out, to verify compliance of overhauled and repaired apparatus, and to complete the necessary documentation.</p> <p>This unit standard is intended for electricians, electronic technicians, and/or mechanics responsible for apparatus repair workshop supervision.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – demonstrate knowledge of the procedures required to overhaul and repair explosion-protected apparatus at a registered workshop engaged in the overhaul and repair of explosion-protected apparatus; – demonstrate knowledge of overhaul and repair for specific explosion-protection techniques; – prepare for overhaul and repair of apparatus; – establish the level of overhaul required; – arrange overhaul and repair work; – verify that apparatus complies with original certification; and – document overhaul and repair work.
----------------	---

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

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

Entry information	
Critical health and safety prerequisites	Unit 26740, <i>Demonstrate and apply intermediate underpinning knowledge of electrical apparatus 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 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 2.8 *Overhaul and repair of 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 *UEENEEM031A, UEENEEM032A, UEENEEM033A* and *UEENEEM034A* 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 operation, installation, maintenance, or servicing of plant or machinery in explosive atmospheres and workshop supervision.

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

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.

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.

Registered workshop – one that is certified under the Australian/New Zealand Certification Scheme for explosion-protected electrical apparatus (ANZEx Scheme) Recognised Service Facilities Program.

Responsible persons – for the purpose of this unit standard are responsible for the processes involved in the inspection and maintenance of explosion-protected equipment and possess, at a minimum, the following:

- a) general understanding of relevant electrical engineering;
- b) practical understanding of explosion-protection principles and techniques;
- c) understanding and ability to read and assess engineering drawings;
- d) working knowledge and understanding of relevant standards in explosion-protection;
- e) basic knowledge of quality assurance, including the principles of auditing, documentation, traceability of measurement and instrument calibration.

Such persons confine their involvement to the management of skilled personnel.

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.

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 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 the procedures required to overhaul and repair explosion-protected apparatus at a registered workshop engaged in the overhaul and repair of explosion-protected apparatus.

Evidence requirements

- 1.1 The scope and limitations for overhauling and repairing explosion-protected apparatus are explained in terms of a registered workshop.
- Range workshop registration requirements, requirements of a competent person, scope and limitations of work permitted.
- 1.2 The overhaul and repair technical Standard is described.
- Range overhauls and repairs documentation/information; categories of work including overhaul, no repair and overhaul-repair; permitted and non-permitted modification certification; requirements for overhaul and repair processes relevant to the type of protection and apparatus.
- 1.3 Requirements for documentation for and identification of overhauled/repared explosion-protected apparatus are described.
- Range overhaul and repair report, requirements for the distribution of overhaul and repair reports.
- 1.4 Quality management systems as covered by international Standards are described.
- Range regime of a quality management system documentation; principle of document and data control covering both internally and externally generated documents and data; principles of process control as applied to the overhaul and repair of explosion-protected apparatus.

Outcome 2

Demonstrate knowledge of overhaul and repair for specific explosion-protection techniques.

Evidence requirements

- 2.1 The use of Standards in determining the requirements to which the design of explosion-protected apparatus is to comply is described.
- 2.2 The level of overhaul and repair required for an item of apparatus is identified and explained.
- Range standards and their use for determining the requirement for a specific explosion-protection technique.
- 2.3 Measurements or tests and apparatus required to determine whether an item of apparatus meets the certification requirements are described.
- 2.4 Requirements for maintaining the accuracy or calibration of measuring/test apparatus are described.

- 2.5 Measurement or test procedures for determining whether an item of apparatus meets the certification requirements are described.
- 2.6 The level of overhaul or repair required from comparisons of test results and requirements specified in the original certification are described.
- 2.7 Requirements for specifying overhaul or repair work required to restore an item of explosion-protected apparatus to conform to the original certification is described.
- 2.8 Measurement or test procedures to verify that an item of apparatus meets the original certification requirements are described.

Outcome 3

Prepare for overhaul and repair of apparatus.

Evidence requirements

- 3.1 Overhaul and repair instructions are received, and expected outcomes of the work confirmed with appropriate personnel.
- 3.2 Apparatus certification documents are sought and received in order to check that the apparatus complies with certification.

Range measuring, testing, and inspecting apparatus for compliance with certification and Standards.

Outcome 4

Establish the level of overhaul required.

Evidence requirements

- 4.1 Measurements, tests and inspections are carried out on the apparatus in accordance with OSH and other established procedures.
- 4.2 The extent of work required is determined from measurement, test and inspection results and their correspondence with original certification and the requirements of Standards.
- 4.3 Specifications and instructions for the overhaul and repair work are documented in accordance with requirements.

Outcome 5

Arrange overhaul and repair work.

Evidence requirements

- 5.1 Arrangements are made for the overhaul and repair work to be done in accordance with established procedures.

- 5.2 A copy of overhaul or repair specifications and instructions is provided to personnel responsible for carrying out the work.

Outcome 6

Verify that apparatus complies with original certification.

Evidence requirements

- 6.1 Level of testing required to verify that overhauled and repaired apparatus complies with original certification specifications is determined in accordance with requirements.
- 6.2 Verification tests are conducted in accordance with established procedures.

Outcome 7

Document overhaul and repair work.

Evidence requirements

- 7.1 Apparatus marking is checked and marked where applicable in accordance with original certification.
- 7.2 Overhaul and repair work is documented in accordance with requirements stating that the apparatus complies with the original certification.
- 7.3 Documentation of the repair work is retained, and a copy is issued with the apparatus for inclusion in the verification dossier.

Planned review date	31 December 2016
----------------------------	------------------

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 May 2011	N/A

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

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 (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.

Comments on this unit standard

Please contact the ElectroTechnology Industry Training Organisation (ETITO) reviewcomments@etito.co.nz if you wish to suggest changes to the content of this unit standard.