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|--------------|------------------------------------------------------|----------------|----------|
| <b>Title</b> | <b>Attend to breakdowns in explosive atmospheres</b> |                |          |
| <b>Level</b> | <b>4</b>                                             | <b>Credits</b> | <b>9</b> |

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| <b>Purpose</b> | <p>This unit standard covers the explosion-protection aspects related to attendance to a breakdown in an explosive atmosphere, or of explosion-protected and associated apparatus. It requires the ability to ascertain the nature of a breakdown, the extent of repairs required and the personnel needed to repair the breakdown.</p> <p>This unit standard is intended for electricians, technicians, or engineers who are responsible for attending to breakdowns in explosive atmospheres, or of explosion-protected and associated apparatus.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>- prepare to attend breakdown;</li> <li>- evaluate extent of work;</li> <li>- arrange repair work; and</li> <li>- confirm completion of work.</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 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:

| <b>Unit endorsement suffix</b> | <b>Competence demonstrated</b>                            |
|--------------------------------|-----------------------------------------------------------|
| 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 2.3 *Attend to breakdowns in hazardous areas* 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 *UEENEEM019A*, *UEENEEM020A*, *UEENEEM021A*, and *UEENEEM022A* 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 attending to breakdowns in general electrical, instrumentation, or mechanical plant, or apparatus service and maintenance at NZQF Level 4 or above.
- 5 Competence is to be demonstrated in relation to any classified hazardous areas and explosion-protection techniques. Where competency is demonstrated on wiring/cabling and apparatus that operate at extra low voltage and low voltage, 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 time of assessment.
- 6 References  
AS/NZS 1768:2007, *Lightning protection*;  
AS/NZS 3000:2007, *Electrical installations (known as the Australian/New Zealand Wiring Rules)*;  
AS/NZS 4761.1:2008, *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 (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 Standards Australia);  
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 all subsequent amendments and replacements.

## 7 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.

*Certification documentation* – document(s) that assure(s) the conformity of a product, process, system, person, or organisation with specified requirements.

*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.

*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.

## 8 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.

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## Outcomes and evidence requirements

### Outcome 1

Prepare to attend breakdown.

### Evidence requirements

- 1.1 Nature of the breakdown is confirmed with appropriate personnel to establish the need to enter the explosive atmospheres area.
- 1.2 Maintenance records of apparatus related to the reported breakdown are reviewed for possible causes and extent of breakdown is evaluated.
- 1.3 Testing devices and tools, anticipated as being needed for the work, are obtained and checked for correct operation and safety.

- 1.4 Safety to enter the explosive atmospheres area is determined in accordance with established procedures and relevant clearance to work is obtained.

Range may include but is not limited to – erection of signage at access points to work area.

## **Outcome 2**

Evaluate extent of work.

### **Evidence requirements**

- 2.1 Extent of breakdown is evaluated and confirmed with appropriate personnel.
- 2.2 Other personnel required to determine cause and rectify breakdown are ascertained from available evidence and arrangements made for their attendance where applicable.
- 2.3 Extent of repair work is ascertained from available evidence and confirmed with appropriate personnel.
- 2.4 Limits of repair work that can be carried out in situ are established with regard to explosion risk and in accordance with established procedures and requirements.

## **Outcome 3**

Arrange repair work.

### **Evidence requirements**

- 3.1 Apparatus is isolated in accordance with established procedures.
- 3.2 Circuits of apparatus being withdrawn from service are terminated or isolated safely by appropriately qualified personnel and in a manner approved for the classification of the area.
- 3.3 Certification documentation for replacement apparatus is sighted to ensure that it is identical to the apparatus it replaces and is in accordance with the explosion-protection system design.
- 3.4 Repair work carried out in situ is done in accordance with established procedures and requirements.

**Outcome 4**

Confirm completion of work.

**Evidence requirements**

- 4.1 Explosion-protected apparatus and systems are inspected and tested by appropriately qualified personnel after repairs are completed to ensure the integrity of the system.
- 4.2 Appropriate personnel are notified of the completion of the repair work and details are documented in the verification dossier in accordance with established procedures and requirements.

Range completion of repair work may include but is not limited to – removal of signage at access points to work area.

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| <b>Planned review date</b> | 31 December 2016 |
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**Status information and last date for assessment for superseded versions**

| Process      | Version | Date           | Last Date for Assessment |
|--------------|---------|----------------|--------------------------|
| Registration | 1       | 29 August 2000 | 30 June 2012             |
| Review       | 2       | 20 May 2011    | N/A                      |

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| <b>Consent and Moderation Requirements (CMR) reference</b> | 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.

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**Comments on this unit standard**

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