

<b>Title</b>	<b>Inspect and fit plugs/couplers for reeling, trailing, and flexible electrical cables</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>1</b>

<b>Purpose</b>	<p>This unit standard covers the inspection, component replacement, and fitting of plugs/couplers on reeling, trailing, and flexible cables for use in hazardous areas and explosive atmospheres. It requires the ability to work safely and to Standards, to evaluate the condition of the plugs/couplers, to identify correct core and pin configurations, to apply repair techniques and to document repair/replacement work.</p> <p>This unit standard is intended for electrical service technicians or electricians who are responsible for electrical apparatus overhaul and repair.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– demonstrate knowledge of reeling, trailing, and flexible cable plug and coupler inspection and fitting techniques;</li> <li>– prepare to repair cable;</li> <li>– inspect and fit plugs/couplers; and</li> <li>– complete and document cable repair work.</li> </ul>
----------------	---

<b>Classification</b>	Explosive Atmospheres > Electrical Apparatus in Explosive Atmospheres - Operations
-----------------------	--

<b>Available grade</b>	Achieved
------------------------	----------

<b>Entry information</b>	
<b>Critical health and safety prerequisites</b>	Unit 26739, <i>Demonstrate introductory 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 This unit standard is directly equivalent to Unit 2.25 *Inspect and fit plugs/couplers for reeling, trailing and flexible cables* 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 Standard *UEENEEM072A* from UEE07 Electrotechnology Training Package Version 3.1 (copyright Australian National Training Information Service).
- 3 This unit standard is intended to be delivered and assessed against in conjunction with other work skills related to general electrical overhaul or repair work.
- 4 References  
AS/NZS 1768:2007, *Lightning protection*;  
AS/NZS 2802:2000, *Electric cables – Reeling and trailing for mining and general use (other than underground coal mining)*;  
AS/NZS 2802:2000/Amendment 1:2003, *Electric cables – Reeling and trailing for mining and general use (other than underground coal mining)*;  
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 in 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;  
*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.

## 5 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.

## 6 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.
- f Evidence is required for repair to at least four separate cables, which have all of the following features and associated AS/NZS designated cable type:
- Standard conductor construction:  
209; 210; 240; 241; 260; 275; 409; 412.1; 440; 441.1; 441; 450; 455.
- Super flexible:  
245.
- HV-EP-90 insulated:  
441; 450; 455.
- Semi conductive extruded screens:  
241; 245; 441.1; 441; 450; 455.
- Metal braided screens:  
209; 210; 240; 260; 409; 440; 450.
- Interstitial earths:  
241; 245; 275; 412.1; 441.1; 441; 450; 455.
- Interstitial pilots:  
240; 260; 440; 450; 455.
- Central pilot:  
209; 210; 241; 245; 275; 409; 441.1; 441.
- Pliable armour:  
260; 412.1.

---

## Outcomes and evidence requirements

### Outcome 1

Demonstrate knowledge of reeling, trailing, and flexible cable plug and coupler inspection and fitting techniques.

#### Evidence requirements

- 1.1 Types of plugs and couplers are described.
- 1.2 Inspection process and techniques are explained.
- Range components of plug and couplers that are required to be inspected, inspection procedures, condition of each component's effect on fitness for service.
- 1.3 Fitting processes and techniques are described.
- Range factors affecting the correct fitting of plug and coupler, cable preparation requirements and techniques, conductor termination methods and techniques.

### Outcome 2

Prepare to repair cable.

**Evidence requirements**

- 2.1 Cable to be repaired is confirmed with appropriate personnel and the cable type is identified.
- 2.2 Cable plugs/couplers are identified by marking and explosion-protection certification documentation.
- 2.3 Materials required for the repair are obtained in accordance with established procedures.
- 2.4 Special tools, apparatus and testing devices required to carry out work on plugs/couplers are obtained and checked for correct operation and safety.

**Outcome 3**

Inspect and fit plugs/couplers.

**Evidence requirements**

- 3.1 Plugs/couplers are inspected for damage to housings, pins, and sockets and defects to any explosion-protection component.
- 3.2 Arrangements are made for repair or replacement of damaged or defective components.
- 3.3 Replacement components are identified as being authorised by the plugs/coupler's manufacturer.
- 3.4 Correct phasing for voltage, current, and pin configurations are identified.
- 3.5 Cable cores are prepared and terminated to correct length using relevant terminating methods.
- 3.6 Cable is prepared and terminated in plug and coupler ensuring correct termination length, sheath protrusion, and clamping and creepage and clearances are maintained.
- 3.7 Cable tails, leads, and terminations are inspected to ensure they are correct and sound.

**Outcome 4**

Complete and document cable repair work.

**Evidence requirements**

- 4.1 Plugs/couplers repair work is documented in accordance with established procedures.

- 4.2 Appropriate personnel are notified of the completion of the work in accordance with established procedures.

<b>Planned review date</b>	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

<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.

#### 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.