Australian Government

Department of Education, Employment and Workplace Relations

UEENEEM072A Inspect and fit plugs/couplers for reeling, trailing and flexible cables

Release: 2

UEENEEM072A Inspect and fit plugs/couplers for reeling, trailing and flexible cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the inspection, component replacement and fitting of plugs/couplers on reeling, trailing and flexible cables. 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.
This unit is directly equivalent to the Unit *2.25 Inspect and fit plugs/couplers for reeling, trailing and flexible cables* in the Australian/New Zealand Standard *AS/NZS 4761.1 Competencies for working with electrical equipment for hazardous areas* (*EEHA*) *Part 1*: *Competency Standards*. Equivalence includes endorsement in the explosion-protection techniques listed in the Range statement of this unit.
Note:
Although this unit is primarily intended for the repair of cable types specified by AS/NZS 1802 and AS/NZS 2802 and used in mining, it may be applied to the repair of other similar cables.

Application of the Unit

Application of the Unit **4**)

This unit applies to mining cable and associated equipment overhaul and repair job functions at AQF 3 level or higher. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit do not require a license to practice in the work place. However practice in this unit is subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

There are no prerequisites specified for this unit; however, competencies in general overhaul or repair work would assist in achieving this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to repair cable	1.1 OHS policies and procedures for entering a work site are followed.
	1.2 Cable to be repaired is confirmed with appropriate personnel and the cable type is identified.
	1.3 Cable plugs/couplers are identified by marking and explosion-protection certification documentation.
	1.4 Materials required for the repair are obtained in accordance with established procedures.
	1.5 Special tools, equipment and testing devices needed to carry out the plugs/couplers work are obtained and checked for correct operation and safety.
2 Inspect and fit plugs/couplers	2.1 OHS policies and procedures for inspecting and fitting plugs and couplers are followed.
	2.2 Plugs/couplers are inspected for damage to housings, pins and sockets and defects to any explosion-protection part/component.
	2.3 Arrangements are made for repair or replacement of damaged or defective parts/components.
	2.4 Replacement parts/components are identified as being authorized by the plugs/couplers manufacturer.
	2.5 Correct phasing for voltage, current and pin configurations are identified.
	2.6 Cable cores are prepared and terminated to correct length using relevant soldering or crimping methods.
	2.7 Cable is prepared and terminated in plug and coupler ensuring correct termination length, sheath protrusion and clamping and creepage and clearances are maintained.

ELEMENT	PERFORMANCE CRITERIA	
	2.8	Cable tails, leads and terminations are inspected to ensure they are correct and sound.
3 Complete and document cable repair work	3.1	OHS policies and procedures for completing plugs/couplers repair work are followed.
	3.2	Plugs/couplers repair work carried out is documented in accordance with established quality procedures.
	3.3	Appropriate personnel are notified of the completion of the work in accordance with established quality procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and testing installations in hazardous areas.
All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EM072A Ex reeling cable repair - plugs/couplings and inspection

Evidence shall show an understanding of Ex reeling cable repair - plugs/couplings and inspection to an extent indicated by the following aspects:

T1 Occupational Health and Safety responsibilities related to hazardous areas encompassing:

- the main features and purpose of a ‘clearance to work’ system (includes hot work permit systems).
- typical safety procedures that should be followed before entering a hazardous area;
- the purpose of gas detectors and their limitations;
- effects of temperature on gas and vapour detection;
- frequency of monitoring for presence of gas or vapours, i.e. effects of temperature rise;
- factors affecting the accuracy of gas detectors, for example, contamination, condensation, temperature;
- safety in use of gas detectors, for example, ‘read and run concept’
- the safety precautions to be taken when working in a hazardous area.

T2 The roles of the parties involved in the safety of hazardous areas encompassing:

- common Acts and Regulations related to the safety of hazardous areas and the Authorities responsible for their implementation;
- where assistance and further information can be obtained to assist persons with hazardous area responsibilities, for example, Standard bodies, experienced consultants; and
- the hazardous area responsibilities of the owner of premises in which a hazardous area exists; the occupier of premises in which a hazardous area exists; enterprises and personnel engaged in installation and/or maintenance of

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explosion-protection systems; enterprises and personnel engaged in the classification of hazardous areas and/or design of explosion-protection systems; enterprises and personnel engaged in the overhaul, modification and/or assessment of explosion-protected equipment; enterprises and personnel engaged in the inspection of explosion-protection installations; manufacturers of explosion-protected equipment; designated authorities; insurers.

REQUIRED SKILLS AND KNOWLEDGE

T3 Properties of combustible substances and their potential to create an explosive hazard encompassing:

- condition in the workplace that will lead to an explosion;
- the terms ‘combustion’, ‘ignition’ and ‘propagation’;
- explosive range of substances encountered in the workplace i.e. LEL/UEL;
- explosive parameters of substances as given in tables of substance properties
- Note: Combustible materials are gases, vapours (from liquids), and dusts; flash point.
- the difference between gases and vapours; and
- the toxic nature of gases and vapours and potential harmful consequences.

T4 The nature of hazardous areas encompassing:

- the Standards definition of a ‘hazardous area’;
- the recommended methods for classifying the type and degree of explosion hazard in an area;
- hazardous area classifications as defined by Standards; and
- factors that are considered when a hazardous area is classified.
- the basics of how explosion-protection is achieved by the methods of exclusion, containment, energy limitation, dilution, avoidance of ignition source.

T5 Explosive-protected equipment encompassing:

- The principles of each explosion-protection technique, the methods used and how each technique works (Flameproof (Ex ‘d’); Increased safety (Ex ‘e’); Non-sparking (Ex ‘n’); Intrinsic safety (Ex ‘i’) and Pressurization (Ex ‘p’) for gas atmospheres and Dust-exclusion enclosures (Ex ‘tD’); Pressurization (Ex ‘pD’); Encapsulation (Ex ‘mD’); and Intrinsic safety (Ex ‘iD’) for dusts)
- How explosion-protected equipment is identified by the ‘Ex’ symbol marked on the equipment, including old equipment and equipment certified in another country.
- Visible conditions or actions that would void the explosion-protection provided by a particular technique.

T6 Explosion-protection equipment — Ex certification schemes encompassing:

- Purpose and scope of certification schemes.
- Schemes accepted in Australia and New Zealand.
- Schemes commonly used in countries other than Australia and New Zealand.
- Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T7 Flameproof (Ex ‘d’) explosion-protection technique encompassing:

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- The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex ‘d’) technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).
- Typical situations where the flameproof explosion-protection technique is used;
- Actions or conditions that would void the protection provided the Flameproof technique;
- The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

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T8 Increased safety (Ex ‘e’) explosion-protection technique encompassing:

- The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex ‘e’) technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).
- Typical situations where the Increased safety explosion-protection technique is used;
- Actions or conditions that would void the protection provided the Increased safety technique;
- The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T9 Intrinsic safety (Ex ‘i’) explosion-protection technique encompassing:

- The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex ‘i’) technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).
- Typical situations where the Intrinsic safety explosion-protection technique is used;
- Actions or conditions that would void the protection provided the Intrinsic safety;
- The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T10 Enclosures for dusts (Ex ‘tD’) - explosion-protection technique encompassing:

- The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).
- Typical situations where the each dust explosion-protection technique is used;
- Actions or conditions that would void the protection provided the each dust technique;
- The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T11 Common characteristics of explosion-protection techniques encompassing:

- The purposes of ‘temperature classification’ and ‘gas grouping/apparatus grouping’.
- Compliance plate markings.
- Limitations of non-metallic or specific alloy enclosures.
- The purpose of conformity and certification/approval for equipment used in

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hazardous areas.

- Environmental conditions that may impact on explosion-protection techniques.
- The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex ‘m’; oil-immersion Ex ‘o’; powder-filling Ex ‘q’, ventilation Ex ‘v’ and special protection Ex ‘s’).
- Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T12 Reeling, trailing and flexible cable plug and coupler inspection and fitting techniques encompassing:

- Types of plugs and couplers.
- Inspection process and techniques:-
  - parts of plug and couplers that are required to be inspected;
  - inspection procedures; and
  - condition of each part effecting fitness for service.
- Fitting processes and techniques:-
  - factors affecting the correct fitting of plug and coupler;
  - cable preparation requirements and techniques; and
  - conductor termination methods and techniques.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.
The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)
Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with industry and regulatory policy.
Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.
The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment. Activities associated with normal everyday work influence decisions about how/how much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this

9.2)
Before the critical aspects of evidence are considered all prerequisites shall be met.

EVIDENCE GUIDE

unit

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria must be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Inspecting and fitting of plugs/couplers to four cables as described in 8) and including:

    A Following OHS procedures.

    B Identifying plugs/couplers by marking and explosion-protection certification documentation.

    C Identifying and ascertaining the condition of plugs/couplers correctly.

    D Identifying replacement parts/components as being authorized by the plugs/couplers manufacturer.

    E Fitting plugs/couplers with correct phasing and maintaining the integrity of the explosion-

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protection techniques.

F Documenting plugs/couplers repair in accordance with established quality procedures.

G Applying relevant contingency management skills.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should also be part of the formal learning/assessment environment.
Note:
Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to testing installations in hazardous areas.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.
Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment primarily intended for learning/assessment which incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

No units applicable.

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Competency in this unit shall be demonstrated in relation to inspecting and fitting of plugs/couplers certified for each explosion-protection technique of flameproof (Ex 'd'), increased safety (Ex 'e') intrinsically safe (Ex 'i') and encapsulation-dusts (Ex 'mD'). Among the four cables for which competency is demonstrated all of the following features shall be included:

Cable features	**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.
Sheath reinforcement	241; 245; 274; 441.1; 441; 450; 455.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills
Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

Custom Content Section

Competency Field **5)**

Hazards