



Australian Government

UEEHA0024 Inspect, maintain and fit plugs/couplers for reeling, trailing and flexible cables - coal mining

Release: 1

UEEHA0024 Inspect, maintain and fit plugs/couplers for reeling, trailing and flexible cables - coal mining

Modification History

Release 1. This is the first release of this unit of competency in the Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to inspect, maintain by component replacement, and fit plugs/couplers on reeling, trailing and flexible cables used in coal mining. It includes: working safely and to standards; evaluating the condition of plugs/couplers; identifying correct core and pin configurations; applying maintenance techniques; and documenting repair/replacement work.

It is adopted from clause 2.19 of AS/NZS 4761.1:2018 Competencies for working with electrical equipment for hazardous areas (EEHA). There may be differences between the content of this unit and AS/NZS 4761.1:2018, so the Standard must be checked to ensure compliance with it.

This unit applies to electrical equipment overhaul and repair job functions.

Site-specific work permits may be required to work in the hazardous environment. In addition, other permits may be required, such as confined space and to operate specific pieces of equipment such as elevated work platforms in various jurisdictions.

Additional and/or other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to work health and safety (WHS)/occupational health and safety (OHS) regulations.

Pre-requisite Unit

UEEHA0036 Test reeling, trailing and flexible cables and their attachments used in coal mining

Competency Field

Hazards

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to inspect and fit plugs/couplers

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Safe work methods to inspect and fit plugs/couplers are obtained and interpreted

1.2 Cable plugs/couplers to be inspected are confirmed with supervising personnel

1.3 Types of plugs/couplers are identified by marking and explosion-protection certification documentation

1.4 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 plugs/ couplers

2.1 Safe work methods to carry out inspecting plugs/couplers are applied

2.2 Knowledge of the explosion-protection types and features for plugs and couplers is applied to the inspection process

2.3 Plugs/couplers are dismantled and inspected for damage to housings, pins and sockets and defects to explosion-protection parts/components

2.4 Damage to plugs/coupling housings, pins and sockets and defects to explosion-protection parts/components is documented in accordance with quality assurance procedures

2.5 Knowledge of explosion-protected equipment certification is applied to obtaining replacement parts required for the repair and in accordance with quality assurance procedures

2.6 Arrangements are made for maintenance by replacement only of defective items of explosion-protective enclosures/housings in accordance with quality assurance procedures

3 Fit and connect plugs/couplers

3.1 Safe work methods to carry out the fitting of plugs/couplers are applied

- 3.2 Replacement parts/components are identified as being authorized by the plugs/couplers manufacturer and complying with certification documents
 - 3.3 Correct phasing for voltage, current and pin configurations are identified
 - 3.4 Cable is prepared and plugs and couplers fitted ensuring correct termination length, sheath protrusion and clamping are maintained
 - 3.5 Cable cores are prepared and terminated to correct polarity using compliant connection methods maintaining required creepage and clearances
 - 3.6 Cable tails, leads and terminations are inspected to ensure they are correct and sound
 - 3.7 Safe work methods for the care and storage of tools and equipment at the completion of work are applied
- 4 **Complete and document repair work**
 - 4.1 Plug and coupling repair history records are updated in accordance with quality assurance procedures
 - 4.2 Responsible supervisor is notified of the completion of the work in accordance with established quality procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the Electrotechnology Training Package Companion Volume Implementation Guide.

This unit must include these conditions 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 cables for which competency is required all of the following features shall be included:

Cable features	AS/NZS designated cable type
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- Standard conductor construction 209; 210; 240; 241; 260; 275; 409; 412.1; 440; 441.1; 441; 450; 455.
- Super flexible 245.
- XR-EP-90 insulated compound 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.

Unit Mapping Information

This is a new unit.

Links

Companion Volume Implementation Guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEEHA0024 Inspect, maintain and fit plugs/couplers for reeling, trailing and flexible cables - coal mining

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two separate occasions and include:

- preparing to inspect and fit plugs/couplers including:
 - reviewing safe work methods
 - receiving and understanding work instructions
 - identifying plugs/couplers by marking and explosion-protection certification documentation
 - obtaining tools and equipment needed and checking them for correct operation and safety
- inspecting the condition of plugs/couplers including:
 - obtaining and applying safe work methods
 - dismantling plugs/couplers and identifying and noting any damage to housings, pins and sockets and/or defects to any explosion-protection parts/components
 - documenting plug/coupler damage defects in accordance with quality assurance procedures
 - obtaining compliant replacement parts
 - making arrangements for maintenance by replacement only of defective explosion-protective enclosures/housings in accordance with quality assurance procedures
- fits and connects plugs /couplers including:
 - applying safe work methods
 - checking that replacement parts are authorized and compliant
 - preparing and terminating cables maintaining correct termination length, sheath protrusion and clamping
 - preparing and terminating cable cores to correct polarity and maintain required creepage and clearances
 - checking cable tails, leads and terminations
 - applying safe work methods for the care and storage of tools and equipment
- updating plug and coupling repair history record and notifying the responsible supervisor on the completion of the work.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- nature of explosion protection in explosive atmosphere areas including:
 - the standard definition of an ‘explosive atmosphere area’
 - conditions in an explosive atmosphere area that will lead to ignition, combustion and propagation of an explosive atmosphere
 - the explosive nature of flammable substances in the form of gas, vapour, dust, fibres, or flyings
 - low and upper explosive limits (LEL/UEL) and flash point of flammable substances encountered in explosive atmosphere areas
 - the toxic nature of gases and vapours and potentially harmful consequences
 - the classifications given to explosive atmosphere areas
 - electrical equipment as a potential source of ignition
 - characteristics of devices/equipment that require authorization to be taken into an explosive atmosphere area
- methods for preventing ignition of an explosive atmosphere from an electrical source including:
 - exclusion method including:
 - dust ignition protection type ‘tD’ or ‘t’
 - pressurization ‘p’
 - encapsulated ‘m’
 - oil-immersed ‘o’
 - powder filling ‘q’
 - explosion containment method – Flameproof ‘d’ enclosure type
 - energy limitation including:
 - intrinsic safety ‘i’
 - protection type ‘n’ (e.g. non-sparking, hermetically sealed, enclosed break)
 - avoidance of ignition source including:
 - increased safety ‘e’
 - protection type ‘n’
 - dilution—ventilation
- equipment and circuits protected by the flameproof (Ex ‘d’) enclosure type including:
 - how a flameproof-type enclosure works to provide explosion protection
 - features of flameproof enclosures and their function including:
 - enclosure materials
 - flamepaths
 - fasteners
 - gaskets

- enclosure entries
- breathing and drain devices
- attributes of flameproof enclosures including:
 - integrity under pressure
 - suitability for power switching equipment
 - situations where this type can be used
- aspects that are vulnerable to voiding the protection due to defective installation or poor maintenance including:
 - installed location
 - cable/conduit entries
 - flamepaths
 - gaskets
 - fasteners
 - pressure piling
- equipment and circuits protected by the increased safety (Ex ‘e’) method including:
 - how increased safety ‘e’ type works to provide explosion protection
 - features of increased safety and their function including:
 - electrical connections
 - length of conductors within an enclosure
 - clearances between bare conductive parts
 - enclosure entries
 - IP rating of enclosures
 - temperature limitation
 - certified components
 - attributes of increased safety including:
 - absence of sparking contacts
 - situations where this type can be used
 - aspects that are vulnerable to voiding the protection due to poor installation or maintenance including:
 - installed location
 - electrical connections
 - clearances
 - preservation of temperature limitations
 - components
- the purpose and characteristics of the design features of equipment and circuits protected by the intrinsic safety (Ex ‘i’) technique including:
 - how intrinsic safety type works to provide explosion protection
 - features of intrinsic safety and their function including:
 - associated equipment
 - dependant components

- infallible components, assemblies and connections
- external wiring
- safety barrier
- attributes of intrinsic safety including:
 - levels of protection
 - ignition energy limiting
 - entity versus integrated system concept
 - situations where this type can be used
- aspects that are vulnerable to voiding the protection due to poor installation or maintenance including:
 - installed location
 - external wiring
 - methods of earthing/bonding
- the purpose and characteristics of the design features of equipment protected from dust ignition by enclosure ‘t’ covering the following:
 - how dust ignition by enclosure type works to provide explosion protection
 - features of dust ignition by enclosure ‘t’ and their function including:
 - level of protection
 - protective devices
 - gaskets
 - cable/conduit entries
 - situations where this type can be used
 - type protection ‘pD’ in legacy systems
 - aspects that are vulnerable to voiding the protection due to poor installation or maintenance including:
 - cable/conduit entries
 - sealing
 - dust layer accumulation
- the common characteristics of explosion-protection types including:
 - criteria on which equipment protection levels (EPLs) are assigned
 - the purposes of ‘temperature classification’ and ‘equipment grouping’
 - equipment markings (nameplate)
 - limitations of non-metallic or specific alloy enclosures
 - the purpose and use of conformity and certification/approval for equipment used in explosive atmospheres
 - environmental conditions that may impact on explosion-protection techniques
 - the principles and applications of other and mixed explosion- protection techniques
- Standards to which explosion-protected equipment is required to comply including:
 - Standards to which the protective features of each type of explosion protection are required to comply

- typical content of equipment (Ex) certificates including:
 - explosion-protection parameters
 - electrical parameters
 - instruction and limitation of use
- verification dossiers including:
 - purpose
 - content
- ex certification schemes to accepted standards including:
 - purpose and scope of certification schemes
 - accepted certification schemes
 - processes for having equipment certified under the acceptable Ex schemes including:
 - scheme procedures
 - quality management requirements
 - conformance testing and assessment
 - requirements for on-going certification
- features of plugs and couplers including:
 - explosion-protection types
 - pin configuration
 - keying systems
 - IP ratings
- inspection process and techniques including:
 - parts of plugs and couplers that are required to be inspected
 - inspection procedures
 - condition of each part effecting fitness for service
- fitting processes and techniques including:
 - factors affecting the correct fitting of plugs and couplers
 - cable preparation requirements and techniques
 - conductor termination methods.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy

requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate tools and testing devices and PPE currently used in industry
- safe work method documentation
- resources relevant to the cable repairs undertaken and required to be a recognised cable repair workshop to the scope of AS/NZS 1747 with ISO 9001 type quality assurance.

Links

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<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>