



Australian Government

UETDRDU001 Conduct high voltage testing of underground power cable system

Release: 1

UETDRDU001 Conduct high voltage testing of underground power cable system

Modification History

Release 1. This is the first release of this unit of competency in the UET Transmission, Distribution and Rail Sector Training Package Release 2.0.

Application

This unit involves the skills and knowledge required to conduct high voltage (HV) testing of an electricity supply industry (ESI) underground power system.

It includes testing using direct current (d.c.) or alternating current (a.c.) voltage methods to identify cable system defects.

It also includes interpreting the test results to determine the integrity of the cable system.

The application of the skills and knowledge described in this unit may require a licence/registration to practice in the workplace.

Other conditions may also apply under state and territory legislative and regulatory licensing requirements which must be confirmed prior to commencing this unit.

Pre-requisite Unit

UEECD0007 Apply work health and safety regulations, codes and practices in the workplace

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

UEECD0051 Use drawings, diagrams, schedules, standards, codes and specifications

UEEEL0020 Solve problems in low voltage a.c. circuits

UEEEL0021 Solve problems in magnetic and electromagnetic devices

UETDREL005 Work safely in the vicinity of live electrical apparatus

Competency Field

Distribution Underground

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential outcomes.

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

1 Prepare to conduct HV testing of underground power cable system

- 1.1** Legislation, regulations, standards, codes of practice and organisational workplace requirements for the work to be performed are referred to and confirmed
- 1.2** Work instruction is obtained and confirmed in accordance with workplace requirements
- 1.3** Work is prioritised and sequenced for completion in accordance with work instruction and workplace requirements
- 1.4** Hazards are identified, risks assessed and control measures identified and applied
- 1.5** Work permits are organised in accordance with workplace requirements
- 1.6** Tools, equipment and personal protective equipment (PPE) required for work are determined, obtained and confirmed in working order
- 1.7** Testing method is determined and appropriate test equipment is obtained and confirmed in working order in accordance with the work instruction and workplace requirements
- 1.8** Worksite is prepared in accordance with the work instruction and workplace requirements
- 1.9** Traffic management plan is confirmed as being in place in accordance with workplace requirements

2 Carry out the testing of a HV underground power cable system

- 2.1** Legislation, regulations, standards, codes of practice and organisational workplace requirements for the work to be performed are applied and monitored
- 2.2** Lifting, working in confined spaces and the use of tools, equipment and PPE are carried out in accordance with workplace requirements
- 2.3** Hazard control measures are monitored in accordance with workplace requirements

- 2.4 Test equipment is positioned, set up for testing and confirmed to be operating correctly
- 2.5 Cable is confirmed de-energised in accordance with workplace requirements
- 2.6 Work permits are received and signed in accordance with workplace requirements
- 2.7 Cable is prepared for testing and test equipment connected to the cable in accordance with workplace requirements
- 2.8 Cable system is tested to determine the integrity of the system in accordance with workplace requirements
- 2.9 Incidents or unplanned events are responded to in accordance with workplace requirements
- 3 **Complete work and documentation**
 - 3.1 Completed work is checked for compliance against the work instruction and workplace requirements
 - 3.2 Incidents or unplanned events are reported in accordance with workplace requirements
 - 3.3 Worksite is rehabilitated, cleaned and made safe in accordance with workplace requirements
 - 3.4 Tools and equipment are cleaned, checked and returned to storage in accordance with workplace requirements
 - 3.5 Work permits are signed off in accordance with workplace requirements
 - 3.6 Work records, reports and documentation are completed in accordance with workplace requirements

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 UET Transmission, Distribution and Rail Sector

Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UETTDRI59 Conduct high potential testing of power system underground power cables.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=229bace1-b7bc-4653-9300-dffb13ecfad7>

Assessment Requirements for UETDRDU001 Conduct high voltage testing of underground power cable system

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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:

- applying relevant legislation, regulations, standards, codes of practice and organisational workplace requirements, including:
 - work health and safety (WHS)/occupational health and safety (OHS)
 - handling underground power cables
- identifying hazards, assessing risks, identifying, applying and monitoring control measures
- obtaining, inspecting and using relevant personal protective equipment (PPE)
- obtaining and signing on and off relevant work permits in accordance with workplace requirements
- interpreting and using drawings, diagrams and instructions
- using at least one (1) of the following cable testing methods:
 - insulation resistance (IR)
 - very low frequency (VLF) alternating current (a.c.) withstand or monitored withstand
 - direct current (d.c.) withstand
- completing at least three (3) of the following cable tests:
 - sheath integrity
 - core insulation resistance
 - tan delta
 - partial discharge
 - high voltage (HV) withstand (VLF a.c.)
 - HV withstand (d.c.)
- analysing the testing result to determine the integrity of the cable system
- using testing equipment in accordance with workplace requirements
- recording test results in accordance with workplace requirements
- dealing with an unplanned event on at least one (1) occasion
- completing relevant work records, reports and documentation.

Knowledge 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 and include knowledge of:

- legislation, regulations, standards, codes of practice and organisational workplace requirements, including:
 - WHS/OHS
 - safe approach distances
 - working in confined spaces
 - trench safety
 - manual handling
- hazard, risk assessment and risk control requirements, including potential hazards
- types and application of PPE
- safe use of tools and equipment
- application, purpose and types of permits
- events constituting an unplanned event or incident
- procedures for responding to an unplanned event or incident
- work instruction requirements, including:
 - types of and layout of drawings
 - cable routes
 - manufacturer's instructions
 - testing standards
 - workplace documentation procedures
- HV paper insulated and polymeric cables, including:
 - types and sizes
 - construction, characteristics and properties
 - minimum bending radius
- HV testing requirements, including:
 - cable handling techniques
- types of and causes of cable defects, including:
 - poor jointing techniques (joints and terminations)
 - cracking or rupturing of cross-linked polyethylene (XLPE) or paper cable insulation
 - insulation porosity or other material defects
 - impurity inclusion or other contaminants in the main insulation
 - internal voids either in main insulation or in joints and terminations
 - water treeing
 - electrical trees
 - protrusions in the semi-conductive layers
 - insulation surface scratches or scoring
 - overheating by excess current

- insulation damage due to voltage transients
- mechanical damage to the outer sheath
- HV testing methods
- advantages and disadvantages of different HV testing methods
- HV failure of insulation
- use of HV testing equipment
- HV testing procedures.

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 conditions involving realistic and authentic activities that replicate operational 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:

- relevant and appropriate materials, tools, facilities, equipment and PPE currently used for conducting HV testing of underground power cable system
- applicable documentation, including workplace requirements, relevant industry standards, equipment specifications, regulations, codes of practice and manufacturer's instructions.

Links

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