



**Australian Government**

# **Assessment Requirements for UETDRIS026**

## **Diagnose and resolve faults in electrical apparatus**

**Release: 1**

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## **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 4.0.

## **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 (2) 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) requirements
- identifying hazards, assessing risks, and identifying, applying and monitoring control measures
- obtaining, inspecting and using relevant personal protective equipment (PPE)
- dealing with an unplanned event on at least one (1) occasion
- obtaining and signing work permits in accordance with workplace requirements
- completing relevant work records, reports and documentation
- diagnosing and resolving faults in electrical apparatus, including:
  - applying logical diagnostic methods
  - using fault scenarios to test the cause of system faults
  - identifying faults and competency needed to resolve them
  - resolving faults in system controls
  - verifying that the system operates correctly
  - documenting fault rectification.

## **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:

- relevant legislation, regulations, standards, codes of practice and organisational workplace requirements including WHS/OHS requirements
- hazard, risk assessment and risk control requirements
- types and application of PPE
- safe use of plant, 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
- workplace records, reports and documentation
- control of high voltage (HV) and low voltage (LV), including:
  - voltage control devices
  - conditions leading to voltage collapse and system disintegration
  - voltage regulators applied to generators and synchronous phase modifiers
  - electromagnetic voltage regulators
  - series and parallel capacitors
  - on-load tap changer (OLTC) transformers
  - static var compensations (SVCs)
- range of devices covered by SVCs, including:
  - saturated reactor (SR) compensators
  - thyristor controlled reactor (TCR) compensators
  - combined TCR/thyristor-switched capacitor (TSC)
  - production of wave-form distorting harmonics and control devices
- importance of the location in the system of voltage control devices
- the use of graphical methods to calculate the size of var regulating plant
- control of power, including:
  - base load and spinning reserve
  - regulating machines
  - rapid start plant
  - phase shifting transformers and load shedding
  - principles and practices of automated control of individual machines
  - stations and transmission/tie-line elements
  - synchronising power
- the relationship between power and frequency, including:
  - limiting values
  - machine stabilising
  - steam by-pass, rapid valving, slip stabilisers and over-speed limiting
  - use of single pole generator circuit breakers (CB)
  - use of automatic voltage regulators (AVR) as angular stabilisers
  - damped and un-damped system oscillations
  - relationship between fault clearance times and system stability
  - calculation of critical clearance angles based on equal area criteria
- types of communication systems, including:
  - telephone, power line carrier, dedicated cable, microwave links and fibre optics
  - quantities and signals to be communicated
  - advantages and disadvantages of the various systems
  - equipment requirements

- transient over-voltages in power systems, including:
  - switching and lightning over-voltages and their effect on different plant items
  - transient over-voltage control and reduction using surge diverters, shield wires and CB control
  - insulation systems, insulation coordination, insulation grading in plant items, bushings and capacitor bushings
- factors leading to the generation of corona, including consequences, reduction, conductor bundling, grading rings and conductor surface treatment
- power system protection, including:
  - location of current transformer (CT) in major plant items
  - earthing principles and devices
  - fault current control/limitation using neutral earthing compensators (NEC), neutral point earth impedances, high conductivity shield wires and parallel feed interlocking
  - application of different types of protection.

## 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 in industry
- applicable documentation, including workplace requirements, relevant industry standards, equipment specifications, regulations, codes of practice and operation manuals.

## Links

Companion Volume Implementation Guides are found in VETNet -

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