



Australian Government

**Assessment Requirements for
UETDRRC008 Solve problems in low
voltage electrical network circuits in a very
remote community**

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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 2.0.

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 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)
- identifying hazards, assessing risks, identifying, applying and monitoring control measures
- obtaining, inspecting and using relevant personal protective equipment (PPE)
- preparing to enter the workplace, including the use of work permits, clearances and isolation permissions
- confirming network electrical circuits are isolated
- determining the correct operation of the network electrical circuits
- using established methodical processes to solve electrical problems in accordance with workplace requirements, including:
 - choosing correct instruments and ranges for testing and measuring values
 - connecting instruments to measure and calculate values in circuits within the electrical network
- identifying circuit problems, including at least three (3) of the following:
 - high voltage (HV)/low voltage (LV)
 - high resistance
 - low resistance
 - fault current (fuses)
 - kilowatt hour meter faults (no supply, reverse polarity, etc)
 - streetlight faults
- connecting and testing network electrical circuits to determine correct operation
- working from at least one (1) of the following:
 - elevated work platform (EWP)
 - platform
 - ladder

- dealing with an unplanned event on at least (1) one occasion
- completing relevant work records, reporting 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:

- relevant legislation, regulations, standards, codes of practice and organisational workplace requirements, including:
 - WHS/OHS
 - wiring rules requirements
- hazard, risk assessment and risk control requirements, including potential hazards
- types and application of PPE
- alternating current (a.c.) quantities, including:
 - sine, cosine and tangent ratios of a right-angle triangle
 - Pythagoras theorem to a right-angle triangle
 - use of the cathode ray oscilloscope (CRO) to measure direct current (d.c.) and a.c. voltage levels
 - sinusoidal voltage generated by a single turn coil rotated in uniform magnetic fields
 - terms 'period', 'maximum value', 'peak-to-peak value', 'instantaneous value', 'average value', and 'root-mean-square (r.m.s.) value', in relation to a sinusoidal waveform
 - calculation of the instantaneous value of induced voltage of a generated sinusoidal waveform
 - measurement of instantaneous, peak and peak-to-peak values and the period of a sinusoidal waveform
 - calculation of r.m.s. value and frequency of a sinusoidal waveform from values of peak voltage and period
- phasor diagrams, including:
 - purpose of phasor diagrams
 - 'in-phase', 'out-of-phase', 'phase angle' 'lead' and 'lag'
 - phase angle between two or more alternating quantities from a given sinusoidal waveform diagram
 - convention for representing voltage, current and the reference quantity in a phasor diagram
 - drawing phasor diagrams to show the relationship between two or more a.c. values of voltage and/or current
 - determination of phase relationship between two or more sinusoidal waveforms from a given diagram and measurements
- single element a.c. circuits, including:
 - setting up and connecting a single-source resistive a.c. circuit and taking voltage and current measurements to determine the resistance
 - determining the voltage, current resistances from the measurement of given values of any

two of these qualities

- relationship between voltage drops and current in resistive a.c. circuits
- applications of resistive a.c. circuits
- defining 'inductive reactance'
- calculation of inductive reactance for a given inductor and the relationship between inductive reactance and frequency
- application of Ohm's law to determine voltage, current or inductive reactance in a purely inductive a.c. circuit given any two of these quantities
- applications of inductive a.c. circuits
- calculation of capacitive reactance
- application of Ohm's law to determine voltage, current or capacitive reactance in a purely capacitive a.c. circuit given any two of the quantities
- applications of capacitive a.c. circuits
- impedance a.c. circuits, including:
 - impedance and impedance triangle
 - effects of impedance on the neutral and active conductor
 - determining the impedance, current and voltages for a series a.c. circuit
 - drawing and labelling the impedance triangle for a series resistor–capacitor (RC) circuit
 - capacitive components in power circuits and systems and the effect on the phase relationship between voltage and current
 - drawing the equivalent circuit of a practical inductor
 - inductive components in power circuits and systems and their effect on the phase relationship between voltage and current
- power in an a.c. circuit, including:
 - difference between true power, apparent power and reactive power and the units in which these quantities are measured
 - power triangle to show the relationships between true power, apparent power and reactive power
 - terms: power factor and phase angle
 - methods used to measure single phase power, energy and demand
- power factor improvement, including:
 - effects of low power factor
 - requirements for power factor improvement
 - methods used to improve low power factor of an installation
 - local supply authority and wiring rules requirements regarding the power factor of an installation and power factor improvement equipment
- harmonics effect in a.c. systems, including:
 - term harmonic in relation to the sinusoidal waveform of an a.c. power system
 - sources in a.c. systems that produce harmonics
 - problems that may arise in a.c. circuits as a result of harmonics and how these are overcome

- methods and test equipment used to test for harmonics
- multi-phase systems, including:
 - features of a multiphase system
 - two-phase systems (230 V/460 V)
 - comparison of voltages generated by single and multi-phase alternators
 - reasons for the adoption of three phases for power systems
 - how three phases are generated in a single alternator
 - calculation of root mean square (r.m.s.) value of voltage generated in each phase given the maximum value
 - relationship between the phase voltages generated in a multi-phase alternator and the conventions for identifying each
 - term phase sequence (also referred to as phase rotation)
 - phase sequence of a multi-phase supply
- single phase systems
- three phase star-connections, including:
 - connecting a three phase star-connection load
 - phase relationship between line and phase voltages and line and phase currents of a star-connected system
 - determining the r.m.s. value of line and phase voltage given any one of these quantities
 - determining the r.m.s. value of line and phase current given any one of these quantities
 - terms balanced load and unbalanced load
 - balanced and unbalanced loads in typical power systems
- three phase four wire systems, including:
 - purpose of the neutral conductor in three phase four wire systems
 - the effects of a high impedance in the neutral conductor of a three phase four wire system supplying an unbalanced load where multiple earthed neutral (MEN) earthing is employed
- three phase delta-connections and interconnected systems, including:
 - connecting three phase delta loads
 - phase relationship between line and phase voltages and line and phase currents of a delta-connected system
 - determining the r.m.s. value of line and phase voltage given any one of these quantities
 - determining the r.m.s. value of line and phase current given any one of these quantities
 - limitations and uses of open delta connections
 - loads in typical power systems
 - typical combinations of three phase interconnected systems using star-connections and a delta connection
 - relationship between line and phase voltages and line and phase currents in the typical interconnected systems using star-connections and delta connections
- fault loop impedance, including:
 - term fault loop impedance of an a.c. power system

- measuring fault loop impedance of typical circuits
- procedures for testing fault loop impedance
- 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.

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 for solving electrical problems in low voltage network circuits in a very remote community
- 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>