



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **UETTD RIS67A Solve problems in energy supply network equipment**

**Release: 1**

## **UETTDRIS67A Solve problems in energy supply network equipment**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

#### **1) Scope:**

##### **1.1) Descriptor**

This unit covers determining correct operation of energy supply network electrical equipment and providing solutions as they apply to energy supply network electrical equipment.. It encompasses working safely, reading circuit and reticulation diagrams, applying logical problem solving processes from measurements and completing the necessary documentation.

### **Application of the Unit**

#### **Application of the Unit 2)**

This unit is intended as an additional competency to relevant competencies previously acquired and is therefore not applicable to those entering work.

### **Licensing/Regulatory Information**

#### **License to practice 3)**

The skills and knowledge described in this unit require a license to practice in the work place subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant,

**License to practice****3)**

machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

**Pre-Requisites****Prerequisite Unit(s)****4)****Competencies****4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

**Common Unit Group**

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. Circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG101A	Solve problems in electromagnetic

**Prerequisite Unit(s) 4)**

	devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. Circuits
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

**Literacy and numeracy skills 4.2)**

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 4      Writing 4      Numeracy 4

**Employability Skills Information****Employability Skills 5)**

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**

<b>6)</b> Elements describe the essential outcomes of a competency standard 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 solve problems in energy supply network equipment.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 OHS risk control measures and procedures in preparation for the work are followed.
	1.3 The likely extent of work to be undertaken is envisaged from reports and/or discussions with appropriate person(s).
	1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5 Sources of materials that may be required for the work are established in accordance with established procedures.
	1.6 Tools, equipment and testing devices needed to take measurements are obtained in accordance with established procedures and checked for correct operation and safety.
2 Solve problems in energy supply network equipment.	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3 Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4 Safety hazards resulting from the reports and risk control measures devised and implemented in consultation with appropriate personnel.
	2.5 Problem solving is approached methodically drawing on knowledge of energy network equipment using measured and calculated values of circuit/apparatus parameters.
	2.6 Circuit/apparatus components are dismantled where necessary and parts stored to protect them

ELEMENT	PERFORMANCE CRITERIA
	against loss or damage
	2.7 Circuits/components are rechecked and their operational status is confirmed.
	2.8 Materials/replacement parts required to solve problems are sourced and obtained in accordance with established procedures.
	2.9 Effectiveness of the repair is tested in accordance with established procedures.
	2.10 Apparatus is reassembled, finally tested and prepared for return to service.
	2.11 Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.12 Problem solving activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Completion and report for problem solving in energy supply network equipment	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.
	3.3 Maintenance work activities are documented in accordance with established procedures.
	<p>Note.</p> <p>Examples of documentation are component, test results, authorisations, permits, and parts/component dispatch and stores records.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

8) 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 solving problems in energy supply network equipment in energy supply network equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

#### KS01-TIS67A Electricity supply and reticulation

Evidence shall show an understanding of electricity supply and reticulation systems to an extent indicated by the following aspects:

##### T1 Generation encompassing:

- primary energy sources
- power stations
- power station output
- acts and legislation relating to generation
- renewable energy sources and techniques

##### T2 Transmission encompassing:

- system requirements
- principal components of a power system
- voltage levels
- grid systems
- acts/legislation relating to transmission
- future trends

##### T3 Distribution encompassing:

- high voltage distribution systems
- medium/low voltage distribution systems
- radial feeders
- parallel feeders
- ring main feeders
- acts/legislation relating to distribution

##### T4 Substations encompassing:

- purpose
- location
- layout

##### T5 Overhead and underground systems encompassing:

- relative merits

## REQUIRED SKILLS AND KNOWLEDGE

- applications
- planning
- installation

T6 Power distribution system electrical characteristics encompassing:

- transmission and distribution systems
- inductance, capacitance and resistance

T7 Voltage problems in a power distribution system encompassing:

- low voltage
- unbalanced voltages
- voltage rises

T8 Voltage regulation encompassing:

- autotransformers with OLTC
- transformers with OLTC
- static capacitors
- load control

T9 Control of OLTC encompassing:

- regulation relays
- control circuits
- line drop compensation

T10 Power distribution system faults encompassing:

- type/classification of fault
- typical causes/effects of faults
- three-phase symmetrical fault levels
- fault level limitation

T11 Voltage surges in a power distribution system encompassing:

- lightning surges
- switching surges
- typical surge levels
- surge impedance, typical values
- significance of the system surge impedance.

T12 Metering and metered quantities encompassing:

- purpose
- energy
- maximum demand
- accuracy classes for metering systems

T13 Energy and demand meters encompassing:



## REQUIRED SKILLS AND KNOWLEDGE

- construction
- operation
- adjustments
- testing

T14 Metering circuits encompassing:

- direct metering
- instrument transformer metering

T15 Electronic metering systems and recording meters encompassing:

- types
- applications
- connections

T16 Load control encompassing:

- purpose
- methods

## Evidence Guide

### EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit. It 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 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's 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 accordance 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 every day work have a bearing on the decision as to how much and how detailed 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 unit**

**9.2)**

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

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UET12'. 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, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Solving problems in energy supply network equipment as described as described in 8) and including:
    - A Determining the operating parameters of existing energy supply equipment.
    - B Envisaging the likely extent of work from reports and discussion with appropriate person(s).
    - C Using methodical problem solving techniques.
    - D Solving problems efficiently.
    - E Altering an existing energy supply equipment to comply with specified operating parameters.
    - F Developing energy supply equipment to comply with a specified function and operating parameters.
    - G Determining conditions causing an existing energy supply equipment to be unsafe.
    - H Completing documentation correctly.
    - I Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

**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 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 solving problems in energy supply network equipment.

**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 which is primarily intended for learning/assessment and 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)**

For optimisation of training and assessment effort, competency

development in this unit may be arranged concurrently with unit:

UEENEEG00 Solve problems in single and three phase low  
6A voltage machines

## Range Statement

### RANGE STATEMENT

**10)** 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.

This unit shall be demonstrated by solving problems in energy supply network equipment in:

At least one of energy supply network systems:

- distribution overhead system;
- distribution underground system;
- transmission overhead system;
- transmission underground system.

and

At least three of the following distribution/transmission equipment:

- voltage regulation equipment
- on load tap changers
- energy metering
- demand meters
- load control
- current transformers
- potential transformers

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

Competency Field 11)

Industry Specific Cross-Discipline Units