



Australian Government

UEENEEG132A Carry out low voltage electrical field testing and report findings

Release: 2

UEENEEG132A Carry out low voltage electrical field testing and report findings

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers field testing of electrical systems, circuits and apparatus to determine the cause of faults, malfunctions or compliance. It encompasses working safely and to standards, applying knowledge of electrical measurement and testing, following appropriate test procedures, documenting, evaluating and reporting test results.

Application of the Unit

Application of the Unit 2)

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training. It applies to any formal recognition for this standard at the aligned AQF 5 level or higher.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit may require a license to practice in the workplace 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 safety and where applicable contracts of training such as

License to practice**3)**

apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, 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 devices 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 competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101 A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102 A Fabricate, dismantle, assemble of utilities components

UEENEEE104 A Solve problems in d.c circuits

UEENEEE105 A Fix and secure electrotechnology equipment

UEENEEE107 A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEE137 A Document and apply measures to control OHS risks associated with electrotechnology work

Prerequisite Unit(s)**4)**

UEENEEG006 A	Solve problems in single and three phase low voltage machines
UEENEEG033 A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063 A	Arrange circuits, control and protection for general electrical installations
UEENEEG101 A	Solve problems in electromagnetic devices and related circuits
UEENEEG102 A	Solve problems in low voltage a.c. circuit
UEENEEG103 A	Install low voltage wiring and accessories
UEENEEG104 A	Install appliances, switchgear and associated accessories for low voltage electrical installations
UEENEEG105 A	Verify compliance and functionality of low voltage general electrical installations
UEENEEG106 A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG107 A	A Select wiring systems and cables for low voltage general electrical installations
UEENEEG108 A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEG109 A	Develop and connect electrical control 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 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills 5)

This unit contains Employability Skills

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

6) 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 carry out electrical field testing. | 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 situation 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. |

ELEMENT	PERFORMANCE CRITERIA
	1.5 Tools, equipment and testing devices needed to locate faults are obtained in accordance with established procedures and checked for correct operation and safety.
2 Carry out electrical field testing.	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 fault or breakdown are documented and risk control measures devised and implemented in consultation with appropriate personnel.
	2.5 Field testing and measuring is approached methodically drawing on knowledge of electrical systems, circuits, apparatus and testing/measuring techniques appropriate to each test and situation.
	2.6 Circuit apparatus/components are dismantled where necessary to facilitate testing and parts stored to protect them against loss or damage.
	2.7 Tests required are determined from situation report and appropriate testing/measuring instruments selected and set up in accordance with manufacturer's instructions and industry standards.
	2.8 Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.9 Testing activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.

ELEMENT	PERFORMANCE CRITERIA
3 Complete electrical field testing and report findings.	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Apparatus is reassembled after testing where necessary, and work area is cleaned and made safe in accordance with established procedures.
	3.3 Test findings are reported including recommendation for any action to be taken to rectify/modify conditions or parameters shown by the tests.

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 carrying out electrical field testing and report findings.

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

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Electrical field testing and measurement techniques

Evidence shall show an understanding of carrying out electrical field testing and reporting findings to an extent indicated by the following aspects:

T1 Advance electrical testing and measuring devices encompassing:

- Test/measuring devices and their application
- Circuit arrangement and safety procedures for connection of testing/measuring devices into a circuit
- Taking readings
- Storage, maintenance and care of test/measuring devices

T2 Measurement concepts encompassing:

- notion of error, accuracy, resolution
- sources of measurement error and uncertainties
- instrument specifications and calibration certificates
- test and measuring instrument safety certification levels and their application

T3 Types of field measuring instruments and their application encompassing:

- instrument meter movements and readouts

Note

These include moving coil, moving iron and dynamometer meter movements, LCD digital and screen readouts.

- Role of a microprocessor/controller in measuring instrument

T4 Measuring low voltages and direct and alternating currents encompassing:

- low voltage and current measurement techniques embodied in microprocessor based instruments.
- causes of inaccuracies and overcoming them.
- test instrument set up and safety procedures
- interpreting test readings

T5 Measuring high voltages and direct and alternating currents encompassing:

- high voltage and current measurement techniques embodied in microprocessor based instruments

REQUIRED SKILLS AND KNOWLEDGE

- causes of inaccuracies and overcoming them
- test instrument set up and safety procedures
- interpreting test readings

T6 Measuring fault levels and (earth) fault loop impedance encompassing:

- fault and fault loop impedance measurement techniques embodied in microprocessor based instruments
- causes of inaccuracies and overcoming them
- test instrument set up and safety procedures
- interpreting test readings

T7 Measuring power, energy, reactive power, power factor and maximum demand encompassing:

- power measurement techniques embodied in microprocessor based instruments.
- causes of inaccuracies and overcoming them.
- test instrument set up and safety procedures
- interpreting test readings

T8 Measuring power quality encompassing:

- power measurement techniques embodied in microprocessor based instruments.
- causes of inaccuracies and overcoming them.
- test instrument set up and safety procedures
- interpreting test readings.

Note.

Power quality measurement includes waveform distortion, harmonics, power factor and transients.

T9 Power cable faults and fault detection techniques encompassing:

- poor connection (high resistance
- open-circuit
- insulation breakdown and arcing.
- b) Varley and Murray loop tests
- Pulse test
- Echo test
- Radio based tests

T10 Application and limitations of the various cable fault detection techniques encompassing:

- cable fault detection techniques embodied in microprocessor based instruments.
- causes of inaccuracies and overcoming them.
- test instrument set up and safety procedures
- interpreting test readings.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

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**

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 – UEE11'. 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:
 - Carry out electrical field testing and report findings as described in 8) and including:
 - A Envisaging the extent of work from situation reports and discussion with appropriate person(s).
 - B Using methodical testing techniques appropriate to each type of test and situation.
 - C Selecting and setting up appropriate

testing/measuring instruments in accordance with manufacturer's instructions and industry standards.

- D Writing test findings and recommendations of actions to be taken.
- E 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.

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.

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.

The resources used for assessment should reflect current industry practices in relation to carrying out electrical field testing and report findings.

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)

There are no concurrent assessment recommendations for this unit.

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

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 in relation to carrying out and reporting findings of electrical field tests for the purpose of:

Locating faults

Examining operating parameters

Assessing compliance with regulations

Evaluating quality compliance

Note.

Examples of tests are earth system testing including HV installations; Varley loop testing; earth resistance measurements in electro-medical areas; temperature rise and thermography; circuit breaker residual current testing; illumination measurements and interpretation; industrial power factor measurements; radiation leakage in microwave ovens; antennae field strength measurement

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)
	Electrical