



**Australian Government**

# **UEEEL0027 Carry out low voltage electrical field testing and report findings**

**Release: 2**

# **UEEEL0027 Carry out low voltage electrical field testing and report findings**

## **Modification History**

Release 2. Minor Change. Typographic error in prerequisites corrected.

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

## **Application**

This unit involves the skills and knowledge required to carry out low voltage (LV) electrical field testing and report findings.

It includes preparing, inspecting and testing of electrical field systems, documenting and reporting test results.

The skills and knowledge described in this unit require a licence or permit to practice in the workplace where work is carried out on electrical installations which are designed to operate at voltages greater than 50 volt (V) alternating current (a.c.) or 120 V direct current (d.c.).

Competency development activities in this unit are subject to regulations directly related to licensing. Where a licence or permit to practice is not held, a relevant contract of training, such as an Australian Apprenticeship, may be required.

Additional and/or other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to work health and safety (WHS)/occupational health and safety (OHS) regulations.

## **Pre-requisite Unit**

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

UEECD0019 Fabricate, assemble and dismantle utilities industry components

UEECD0020 Fix and secure electrotechnology equipment

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

UEECD0016 Document and apply measures to control WHS risks associated with electrotechnology work

UEEEL0003 Arrange circuits, control and protection for general electrical installations

UEEEL0020 Solve problems in low voltage a.c. circuits

UEEEL0039 Verify compliance and functionality of low voltage general electrical installations

UEEEL0023 Terminate cables, cords and accessories for low voltage circuits

UEEEL0018 Select wiring systems and cables for low voltage general electrical installations

UEEEL0005 Develop and connect electrical control circuits

UEEEL0019 Solve problems in direct current (d.c.) machines

UEEEL0021 Solve problems in electromagnetic devices

UEEEL0014 Isolate, test and troubleshoot low voltage electrical circuits

UEEEL0008 Evaluate and modify low voltage heating equipment and controls

UEEEL0009 Evaluate and modify low voltage lighting circuits, equipment, and controls

UEEEL0010 Evaluate and modify low voltage socket outlets circuits

UEEEL0024 Test and connect alternating current (a.c.) rotating machines

UEEEL0025 Test and connect transformers

UEEEL0012 Install low voltage wiring, appliances, switchgear and associated accessories and

UEECD0043 Solve problems in direct current circuits

or

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

## Competency Field

Electrical

## Unit Sector

Electrotechnology

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Prepare to carry out electrical field inspection and testing**

### PERFORMANCE CRITERIA

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

- 1.1** WHS/OHS requirements and workplace procedures for a given work area are identified, obtained and applied
- 1.2** WHS/OHS risk control measures and workplace procedures in preparation for the work are followed
- 1.3** Scope of work to be undertaken is determined from

- reports and/or discussions with appropriate person/s
- 1.4** Advice is sought from the work supervisor to ensure work activity is coordinated effectively with others
  - 1.5** Tools, equipment and testing devices required to locate faults are obtained in accordance with workplace procedures and checked for correct operation and safety
- 2 Carry out electrical field inspection and testing**
- 2.1** WHS/OHS risk control measures and workplace procedures for carrying out work are followed
  - 2.2** Need to inspect, test and measure live electrical work is determined in accordance with WHS/OHS requirements and workplace procedures
  - 2.3** Circuits/machines/plant are isolated in accordance WHS/OHS requirements and workplace procedures
  - 2.4** Safety hazards from fault/s and/or breakdown are documented and risk control measures implemented in consultation with appropriate person/s
  - 2.5** Field testing and measuring techniques of electrical systems, circuits, and apparatus are conducted in accordance with workplace procedures
  - 2.6** Circuit/apparatus/components are dismantled as required to facilitate testing and parts stored for protection against loss or damage
  - 2.7** Tests are determined from report and appropriate testing/measuring instruments selected in accordance with manufacturer instructions and relevant industry standards
  - 2.8** Unplanned events are responded to in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
  - 2.9** Testing activities are carried out without damage to apparatus, circuits, environment or services using sustainable energy practices
- 3 Complete electrical field testing and report findings**
- 3.1** WHS/OHS work completion risk control measures and workplace procedures are followed
  - 3.2** Apparatus is reassembled after testing as required and work area is cleaned and made safe in accordance with

workplace procedures

- 3.3** Test findings and recommendation for actions are reported in accordance with workplace procedures

## 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 UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Carrying out and reporting findings of electrical field tests must include the following:

- locating faults
- examining operating parameters
- accessing compliance with regulations
- evaluating quality compliance

## Unit Mapping Information

This unit replaces and is equivalent to UEENEEG132A Carry out low voltage electrical field testing and report findings.

## Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

# Assessment Requirements for UEEEL0027 Carry out low voltage electrical field testing and report findings

## Modification History

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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, performance criteria and range of conditions on at least two separate occasions and include:

- applying relevant industry standards
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including using risk control measures
- applying sustainable energy practices
- carrying out inspection and testing, including:
  - selecting and setting up relevant testing/measuring instruments
  - using relevant testing techniques
  - using testing and measuring instruments
- completing electrical field inspection, testing and report findings
- dealing with unplanned events/situations in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- following workplace procedures and instructions
- preparing electrical field testing, including:
  - identifying work from reports and/or discussion with appropriate person/s
  - locating tools, equipment and testing devices.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- advanced electrical testing and measuring devices, including:
  - testing/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 testing/measuring devices
- measurement concepts, including:
  - notion of error, accuracy and resolution
  - sources of measurement error and uncertainties
  - instrument specifications and calibration certificates
  - test and measuring instrument safety certification levels and their application
- types of field measuring instruments and their application, including:
  - instrument meter movements and readouts, including moving coil, moving iron and dynamometer meter movements, liquid crystal display (LCD) digital and screen readouts
  - role of a microprocessor/controller in measuring instrument
- measuring low voltages (LV) and direct currents (d.c.) and alternating currents (a.c.), including:
  - LV 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
- measuring high voltages (HV) and d.c. and a.c. including:
  - HV 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
- measuring fault levels and (earth) fault-loop impedance, including:
  - 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
- measuring power, energy, reactive power, power factor and maximum demand, including:
  - power measurement techniques embodied in microprocessor-based instruments
  - causes of inaccuracies and overcoming them
  - test instrument set-up and safety procedures
  - interpreting test readings
- measuring power quality, including:
  - power measurement techniques embodied in microprocessor-based instruments
  - causes of inaccuracies and overcoming them
  - test instrument set-up and safety procedures
  - interpreting test readings, including power quality measurement, including waveform distortion, harmonics, power factor and transients
- power cable faults and fault detection techniques, including:
  - poor connection (high resistance)

- open circuit
- insulation breakdown and arcing
- Varley and Murray loop tests
- pulse test
- echo test
- radio-based tests
- application and limitations of the various cable fault detection techniques, including:
  - 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
- problem-solving techniques
- relevant industry standards and codes of practice for electrical inspection and testing
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications and operating instructions for tools and equipment
- relevant quality workplace procedures
- relevant sustainable energy practices
- relevant tools, equipment, resources and materials
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies, procedures and instructions.

## 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 suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated suitable workplace operational situations that replicate 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:

- a range of relevant exercises, case studies and/or simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, relevant industry standards, codes of practice and operation manuals.

## Links

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