



**Australian Government**

# **UEENEEP019A Locate and rectify faults in low voltage water heaters using set procedures**

**Release 2**

# UEENEEP019A Locate and rectify faults in low voltage water heaters using set procedures

## Modification History

## Unit Descriptor

### Unit Descriptor

#### 1) Scope:

##### 1.1) Descriptor

This unit covers locating and rectifying fault(s) in water heaters intended to operate to a connected supply up to 1,000 volts a.c. or 1,500 volts d.c. This may be incidental to or a primary and regular function in the workplace. It encompasses following prescribed procedures, working safely, reading circuit diagrams, isolation procedures, identifying faults according to procedures, identifying like for like replacement/repair components according to procedures, selecting and using testing and measuring devices, terminating and connecting cables and conductors, safety testing and reporting.

Note: Limitations of this unit.

This unit does not cover installations:

- a) Where high fault currents are possible,
- b) Comprised of complex electrical apparatus and circuits,
- c) Associated with fixed wiring other than disconnecting and reconnecting electrical appliance, circuits at a switchboard or to general electrical accessories (including switches, socket outlets, circuit protective devices etc.); or installation of or alteration to any part of the fixed electrical wiring system (defined as electrical installing work).listed in the Range Statement of the unit,
- d) In hazardous areas or on electrical appliance that is part of an explosion protection technique.

## 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.

## 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 apprenticeships.

Note:

Candidates are to meet regulator eligibility requirements by providing formal confirmation from the relevant state/territory regulator for the respective work class and scope of work prior to developing and being conferred competent.

## 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.

UEENEEE1 Apply Occupational Health and Safety  
01A regulations, codes and practices in the  
workplace

UEENEEP01 Disconnect / reconnect water heaters  
4A connected to low voltage installation

**Prerequisite Unit(s) 4)**

wiring

**Literacy and numeracy skills 4.2)**

Participants are best equipped to achieve 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 3      Writing 3      Numeracy 3

## **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 identify fault(s)	1.1 Nature of the fault(s) is confirmed in accordance with established procedures and appropriate personnel.
	1.2 The work is planned to ensure OHS policies and established procedures are followed.
	1.3 Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.4 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.5 Possible water heaters fault(s) are checked against job requirements and in accordance with established procedures.
	1.6 Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.
	1.7 Electrical characteristics of water heaters and electrical supply are determined and recorded in accordance with established procedures.
	1.8 Water heaters and associated circuits are identified for isolation purposes, where necessary, in accordance with established procedures.
2 Locate fault(s) in the water heaters	2.1 Water heaters and associated circuits are isolated, where necessary, in accordance with established procedures.
	2.2 Other OHS policies and procedures are followed.
	2.3 Visual checks of the water heaters and components are carried out in accordance with established procedures to detect any abnormal or obvious damage or fault.

**ELEMENT**

**PERFORMANCE CRITERIA**

- 2.4 Safety tests and circuit continuity are progressively carried out to assure isolation, and to detect operational, electrical or other non-conformances or fault(s).
- 2.5 Water heaters are dismantled and/or removed, where necessary, and components stored in accordance with established procedures to protect them against loss or damage.
- 2.6 Fault(s) are confirmed and components to be replaced or adjusted are determined and details recorded in accordance with established procedures.
- 2.7 Ongoing checks of the quality of work are undertaken in accordance with established procedures.
- 3 Rectify fault(s)
  - 3.1 Isolation of water heaters and associated circuits is confirmed in accordance with requirements and established procedures.
  - 3.2 Materials and resources necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
  - 3.3 Adjustments are made in accordance with established procedures, where necessary, to ensure water heaters operates in accordance with intended parameters.
  - 3.4 Fault(s) are rectified in accordance with established procedures, where necessary.
  - 3.5 Approval is obtained in accordance with established procedures from appropriate personnel, before any contingencies are implemented.
  - 3.6 Tests on the water heaters are in accordance with established procedures performed to ensure safe return to service and operation of the water heaters.

**ELEMENT**

**PERFORMANCE CRITERIA**

4 Provide status report(s)

4.1 Status report(s) are completed and notified in accordance with established procedures.

## 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 locate and rectify faults in electrical low voltage appliance following prescribed procedures.

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

#### KS01-EP019A

#### Fault find – water heaters

Evidence shall show an understanding of fault finding water heaters to an extent indicated by the following aspects

T13 Safe fault finding encompassing:

- using safe working practices when carrying out fault finding
- identification of common types of electrical faults (open circuit, short circuit, partial open circuit and partial short circuit)
- symptoms of common faults (human body senses – hearing, smell, sight and touch, electrical measurement – resistance, current and voltage)
- using appropriate test equipment to locate common faults

T14 Single/three phase water heaters encompassing:

- water heaters
- types of single and three phase water heaters
- basic principles of operation of typical water heaters
- identification of basic types of single/three phase water heaters
- interpretation of ratings from nameplates for comparison with any replacement
- principles of operation of control equipment and protection devices associated with a range of single/three phase water heaters
- common faults that occur in single phase water heaters and the indicators of such faults
- techniques to ensure the electrical isolation and the maintenance of electrical isolation of single/three phase water heaters when conducting fault finding on it
- regulatory requirements/obligations in regard to any “live” testing that may be unavoidable
- fault finding procedures
- visual checking techniques on a range of single/three phase water heaters
- using test instrumentation, safely conduct procedures to identify faults in a range of single/three phase water heaters
- rectification all identified faults ensuring appropriate consultation/approval before implementing contingencies



## REQUIRED SKILLS AND KNOWLEDGE

- testing required to ensure repaired equipment is safe for connection to supply
- checking repaired equipment for safe and correct operation

T15 Produce documentation and reports encompassing:

- need to produce status reports and documents to locate and identify isolation mechanisms for a wide range of circuits and associated loads
- production of reports and documents to use a suitable procedure to safely locate and rectify faults in electrical low voltage water heaters following prescribed procedures
- content required in reports and documents used to safely locate and rectify faults in electrical low voltage water heaters following prescribed procedures
- producing reports and documents for the safe location and rectification of faults in electrical low voltage water heaters following prescribed procedures

T16 Enterprise reporting and recording systems encompassing:

- state the purpose and extent of maintaining work activities records in an enterprise
- types of records for maintaining work activities in an enterprise
- methods for recording and maintaining work records
- work records required by regulation requirements
- producing enterprise records and documents for the safe location and rectification of faults in electrical low voltage water heaters following prescribed procedures

## 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 and shall be used in conjunction with all components 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-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. 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 issues inherent in working with electricity, electrical appliance, gas or any other hazardous substance/material present a challenge for those determining competence. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work influence decisions about how/much 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 – UEE11’. Evidence shall also comprise:

- A representative body of performance criteria 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:
  - Locate and rectify faults in low voltage water heaters following prescribed procedures as described in 8) and including:
    - a. Following safe work practices and procedures
    - b. Identification, testing and isolation of water heaters according to requirements
    - c. Preparing to locate faults and repairing water heaters according to requirement/procedures
    - d. Using routine fault finding techniques and procedures
    - e. Identifying and locating fault(s) in accordance with requirements
    - f. Preparation to replace like for like, implementing routine repairs and reconnecting water heaters as per procedures
    - g. Rectifying water heaters fault(s) in accordance with requirements
    - h. Returning to service and testing for polarity, continuity and insulation resistance in accordance with requirements/procedures
    - i. Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a 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, appliance and materials to undertake actual work as prescribed by this unit.
- Workplace evidence to be produced in an industry/regulator approved recording system (logbook) confirming skills development under appropriate supervision

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 locating and rectifying faults in low voltage water heaters following prescribed procedures.

**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 intended primarily for learning/assessment and incorporates all necessary appliance 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 UEENEEP014A Disconnect / reconnect water heaters connected to low voltage installation wiring

## **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 locating and rectifying faults in water heaters intended to operate from fixed wired supply up to 1,000 V a.c or 1,500 V d.c.

Safe Working. Safe procedures for working within in the scope of this unit shall be in accordance with AS/NZS 4836:2001 'Safe working on low-voltage electrical installations.'

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)**

Restricted and Specialisations