



**Australian Government**

# **UEEEL0053 Maintain operation of electrical marine equipment and systems**

**Release: 2**

# **UEEEL0053 Maintain operation of electrical marine equipment and systems**

## **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 service electrical systems and equipment on maritime vessels and ships.

It includes working safely, planning to maintain marine electrical systems and equipment, applying logical fault diagnosis procedures, following fault rectification workplace procedures and maintaining the necessary operational documentation.

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

UEEEL0003 Arrange circuits, control and protection for general electrical installations

UEEEL0020 Solve problems in low voltage a.c. circuits

UEEEL0023 Terminate cables, cords and accessories for low voltage 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

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 maintain operation of electrical marine equipment**

### 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 and understood
- 1.2** WHS/OHS risk control measures and workplace procedures in preparation for the work are followed
- 1.3** Scope of electrical work to be undertaken is determined from fault/breakdown reports and/or discussions with appropriate person/s
- 1.4** Advice is sought from work supervisor to ensure work is coordinated effectively with others
- 1.5** Sources of materials required for the work are determined in accordance with workplace procedures

- |                                                            |             |                                                                                                                                                                                                                 |
|------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                            | <b>1.6</b>  | Tools, equipment and testing devices needed to locate fault/s are obtained in accordance with workplace procedures and checked for correct operation and safety                                                 |
| <b>2 Maintain operation of electrical marine equipment</b> | <b>2.1</b>  | WHS/OHS risk control measures and workplace procedures for carrying out the work are followed                                                                                                                   |
|                                                            | <b>2.2</b>  | Need to test or measure live electrical work is determined in accordance with WHS/OHS requirements and workplace procedures                                                                                     |
|                                                            | <b>2.3</b>  | Electrical circuits/machines/plant are checked and isolated in accordance with WHS/OHS requirements and workplace procedures                                                                                    |
|                                                            | <b>2.4</b>  | Safety hazards resulting from fault/s or breakdown are documented on job safety assessments, risks assessed and control measures implemented in consultation with appropriate person/s and workplace procedures |
|                                                            | <b>2.5</b>  | Fault-finding analysis is approached methodically using measured and calculated values of electrical circuit/apparatus parameters                                                                               |
|                                                            | <b>2.6</b>  | Electrical circuit/apparatus components are dismantled, as required, and parts stored to protect against loss or damage                                                                                         |
|                                                            | <b>2.7</b>  | Faulty circuits/components are rechecked and fault status identified                                                                                                                                            |
|                                                            | <b>2.8</b>  | Materials/replacement parts required to rectify faults are sourced and obtained in accordance with workplace procedures                                                                                         |
|                                                            | <b>2.9</b>  | Effectiveness of repair/s is tested in accordance with workplace procedures                                                                                                                                     |
|                                                            | <b>2.10</b> | Electrical apparatus and circuits are inspected reassembled, tested and prepared for return to service                                                                                                          |
|                                                            | <b>2.11</b> | Unplanned situations are responded to safely and in accordance with workplace procedures with the approval of an authorised person/s                                                                            |
|                                                            | <b>2.12</b> | Fault-finding and repair activities are carried out without damage to apparatus, circuits, the surrounding environment or services using sustainable energy                                                     |

practices

- 3 Complete work and report on operation of electrical marine equipment**
- 3.1** WHS/OHS work completion risk control measures and workplace procedures are followed
- 3.2** Reusable faulty or worn components are tagged and despatched for repair in accordance with workplace procedures
- 3.3** Maintenance work activities are documented 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.

- Maintaining operation of electrical marine equipment must include rectifying at least four of the following faults in marine equipment:
- open circuit
  - short circuit
  - incorrect connections
  - insulation failure
  - unsafe condition
  - apparatus/component failure
  - related mechanical failure

## Unit Mapping Information

This unit replaces and is equivalent to UEENEEG119A Maintain operation of electrical marine equipment and systems.

## 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 UEEEL0053 Maintain operation of electrical marine equipment and systems

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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 methodical fault-finding techniques
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including using risk control measures
- applying sustainable energy principles and practices
- completing and reporting on maintaining operation of electrical marine equipment
- completing workplace documentation correctly
- dealing with unplanned events in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- determining scope of work from fault/breakdown reports and discussions with appropriate person/s
- finding faults efficiently in accordance with workplace procedures and manufacturer specifications
- implementing WHS/OHS workplace procedures and practices
- maintaining operation of electrical marine equipment
- planning to maintain operation of electrical marine equipment
- rectifying faults effectively in accordance with workplace procedures and manufacturer specifications.

## 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:

- alternators, including construction, characteristics and synchronised operation
- apparatus, including:
  - switchboards/distribution boards
  - protective devices such as circuit breakers and earth leakage devices

- control equipment
- socket outlets
- electric vehicles
- motor starters
- associated control devices
- cells and batteries in common use, including:
  - battery configurations and applications
  - capacity
  - cell and battery safety practices
  - discharge and recharge characteristics
  - discharging
  - primary cells
  - recharging
  - secondary cells
  - terminal voltages
- circuits, including:
  - circuits supplying fix equipment
  - lighting
  - motors
  - socket outlets
  - trailing cable and within electric vehicles
- electrical system commissioning requirements and surveys
- marine electrical systems, including switchboards, instrumentation and earthing
- power supplies, including uninterruptible power supply (UPS) systems, batteries, maintenance and battery bank safety procedures
- purpose and types of lighting systems
- purpose, operating parameters and corrosion factors of cathodic protection
- safety equipment and codes and regulations
- switchboards and protection, including purpose, testing and maintenance and equipment removal
- sustainable energy principles and practices
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures.

## 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 suitable simulated 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 other 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

Companion Volume implementation guides are found in VETNet - -

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