



Australian Government

MARC035 Operate and maintain extra low and low voltage electrical systems and equipment

Release: 2

MARC035 Operate and maintain extra low and low voltage electrical systems and equipment

Modification History

Release 2. This is the second release of this unit of competency in the MAR Maritime Training Package.

- Minor statement changes in unit Application
- Minor changes and removed duplication in Performance Evidence
- Minor changes and removed duplication in Knowledge Evidence
- Minor statement changes in Assessment Conditions.

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

Application

This unit involves the skills and knowledge required to operate, test and maintain extra low and low voltage electrical systems and equipment.

Note: Extra low voltage (ELV) systems are those not exceeding 50 Volts alternating current (AC) or 120 Volts direct current (DC). Low voltage systems are those not exceeding 1,000 Volts AC or 1,500 Volts DC.

This unit applies to people working in the maritime industry in the capacity of:

- Marine Engine Driver Grade 1 Near Coastal
- Marine Engine Driver Grade 2 Near Coastal
- Marine Engine Driver Grade 3 Near Coastal

Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 3 NC, Marine Engine Driver Grade 2 NC and a Marine Engine Driver Grade 1 NC as specified in Marine Order 505.

Note: Relevant state or territory electrical licensing requirements apply to persons carrying out installation, maintenance and or repair of electrical circuits or systems that are 50 V AC or above, or 120 V DC or above.

Seafarers seeking certification should check with AMSA.

Pre-requisite Unit

Not Applicable.

Competency Field

C - Equipment Operations

Unit Sector

Not Applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

PERFORMANCE CRITERIA

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

1 Operate electrical systems and equipment

- 1.1 Routine pre-operational checks are carried out on electrical systems and equipment according to manufacturer specifications
- 1.2 Systems and equipment are operated according to manufacturer specifications
- 1.3 Faults are identified and appropriate action is taken to rectify them
- 1.4 Faults are reported and logged promptly and accurately to appropriate personnel

2 Carry out routine maintenance on electrical systems and equipment

- 2.1 Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work
- 2.2 Tools and equipment are selected and checked for serviceability
- 2.3 Components to be maintained are isolated
- 2.4 Systems are tested and test results are compared with manufacturer specifications
- 2.5 Maintenance tasks are carried out to specifications
- 2.6 Unserviceable components are tagged according to organisational procedures and appropriate personnel are notified

3 Isolate faulty components for repair

- 3.1 Faulty items or components are isolated according to workplace procedures

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|--|------------|---|
| | 3.2 | Serviceable items are fitted according to manufacturer specifications |
| | 3.3 | Operational checks are carried out on equipment or system to ensure compliance with manufacturer specifications |
| 4 Clean up and complete documentation | 4.1 | Work area is cleared and cleaned |
| | 4.2 | Materials are disposed of or recycled according to legislative and workplace requirements |
| | 4.3 | Tools and equipment are cleaned, checked and stored according to workplace procedures |
| | 4.4 | Maintenance report is completed according to 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.

Unit Mapping Information

This unit replaces and is equivalent to MARC003 Operate and maintain extra low and low voltage electrical systems and equipment.

Links

Companion Volume Implementation Guides are found in VETNet -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

Assessment Requirements for MARC035 Operate and maintain extra low and low voltage electrical systems and equipment

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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 and performance criteria on at least one occasion and include:

- completing maintenance or fault reports in accordance with vessel workplace procedures
- connecting and disconnecting shore power including:
 - single phase
 - three phase
 - changing incoming phase rotation using on-board switching equipment
- implementing safe and environmentally responsible work practices in testing and maintenance activities including the use of personal protective equipment (PPE)
- locating, interpreting and applying manufacturer specifications for electrical systems and equipment
- operating electrical systems and conducting operator preventive maintenance according to manufacturer recommendations, regulations and workplace procedures to ensure safe operation
- recognising and rectifying electrical system faults and, where necessary, taking steps to make them immediately safe, including:
 - battery faults
 - failure of alternators
 - failure of starter motors
 - performing isolation, lock out or tag out procedures
 - replacing fuses
 - testing battery voltage and specific gravity
 - testing charging system voltage output
 - topping up battery electrolyte levels

- selecting and using appropriate processes, tools and equipment.

Knowledge Evidence

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

- basic care and fault recognition of electrical systems and equipment
- batteries:
 - care and maintenance
 - hazards
 - methods of connecting batteries
 - types
- charging systems:
 - alarms or indicators
 - regulators
- extra low and low voltage electrical systems including:
 - basic care
 - extra low voltage (ELV) systems are those not exceeding 50 Volts alternating current (AC) or 120 Volts direct current (DC)
 - low voltage systems are those not exceeding 1,000 Volts AC or 1,500 Volts DC
 - motors and common equipment
 - relationship between Voltage, Amperage and Power
 - switchboards and cables
- how to recognise and rectify electrical system faults and, where necessary, steps to make them immediately safe, including:
 - battery faults
 - failure of alternators
 - failure of starter motors
 - faults with shore power connections including phase rotations using on-board switching equipment
 - blown fuses
 - tripping circuit breakers
- protective devices on switchboards including:
 - selection of correct capacity
 - use of fuses and circuit breakers
- relevant state/territory training and qualification requirements for carrying out installation, maintenance and/or repair of electrical systems and equipment
- reporting and recording of faults and maintenance workplace procedures
- shore power connection includes:
 - single phase
 - three phase

- changing incoming phase rotation using on-board switching equipment
- starter motors, alternators and associated equipment:
 - maintenance
 - operation
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

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 current at the time of assessment.

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.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- a commercial vessel with inboard diesel propulsion power of greater than or equal to 150 kW or appropriate engine, propulsion plant, and auxiliary equipment with low and extra low voltage (ELV) electrical systems ashore
- tools, equipment, machinery, materials and relevant PPE currently used in industry.

Links

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