



Australian Government

MARC049 Operate 240 to 440 voltage alternating current electrical systems

Release: 2

MARC049 Operate 240 to 440 voltage alternating current electrical systems

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 MO505 statement changes in Knowledge Evidence
- Minor statement changes in Assessment Conditions.

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

Application

This unit involves the skills and knowledge required to operate a 240 to 440 volts (V) alternating current (AC) electrical system according to technical specifications and safe operating limits.

It includes preparing for operation, operating electrical systems, and checking and completing operations of electrical systems.

This unit applies to people working in the maritime industry in the capacity of Marine Engine Driver Grade 1 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 1 Near Coastal, as specified in Marine Order 505.

Note: Relevant state/territory training and qualification requirements must be fulfilled by any persons carrying out installation, maintenance and/or repair of electrical circuits or systems that are 50 V AC or above, or 120 V direct current (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 Prepare for operation | 1.1 Risks to self, others and the environment are identified according to organisational procedures |
| | 1.2 Routine pre-operational checks of electrical systems are completed prior to use according to manufacturer specifications and organisational procedures |
| 2 Operate electrical systems | 2.1 Suitable personal protective equipment (PPE) is selected and used according to organisational procedures |
| | 2.2 Electrical systems are operated in a safe and controlled manner |
| | 2.3 Performance of DC and AC electrical systems is monitored |
| | 2.4 AC electrical demand is monitored and additional generators are paralleled or disconnected, as required |
| | 2.5 Ship-to-shore electrical supply is connected and disconnected, when required, following established practices and organisational procedures |
| | 2.6 Faults or malfunctions are identified and reported according to organisational procedures |
| | 2.7 Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures |
| | 2.8 Procedures to be undertaken in emergencies are recognised and implemented |
| 3 Complete operations and check electrical systems | 3.1 Shutdown procedures are conducted according to manufacturer instructions and organisational procedures |
| | 3.2 Operational records are completed according to organisational 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 MARC017 Operate 240 to 440 voltage alternating current electrical systems.

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 MARC049 Operate 240 to 440 voltage alternating current electrical systems

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 MO505 statement changes in Knowledge Evidence
- Minor statement changes in Assessment Conditions.

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

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:

- carrying out necessary calculations associated with managing electrical systems, including:
 - adding resistors in series and parallel, and calculating current
 - battery ampere-hours and efficiency
 - series and parallel configuration of battery supply
- connecting to shore power
- isolating and locking out of electrical circuits
- maintaining records of operation of electrical systems, and any related safety incidents
- monitoring and evaluating performance of electrical systems
- performing switchboard operations, including the monitoring of electrical supply and procedures for paralleling generators
- starting emergency alternator and supply switchboard where available
- using hydrometer
- using multimeter to test for voltage and continuity.

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:

- batteries, including:
 - charging circuits and hazards associated with charging batteries
 - operation
 - types, care and hazards
- characteristics of electrical systems

- dangers associated with operation of shipboard electrical systems and related hazard prevention strategies
- earth detection devices
- electrical distribution systems, including emergency arrangements
- electrical systems must include:
 - alternators
 - batteries and associated circuits
 - control circuits
 - motors
 - starter circuits
 - switchboards
- faults associated with electrical systems and appropriate preventative and remedial actions, and solutions
- manufacturer instructions for the operation of electrical systems
- methods for managing operation of shipboard electrical systems
- motor and alternator construction
- motor starter circuits
- own ability and limits to rectify irregularities and faults
- principles of operation of various shipboard emergency systems, including fire detection system, internal communications system and emergency generator
- procedures for monitoring and evaluating performance of electrical systems
- relevant performance of electrical systems when unsatisfactory or outside of specified limits and appropriate actions to be taken
- relevant problems that may occur with electrical systems and appropriate preventative and remedial actions to be taken
- relevant sections of state and territory maritime regulations, Marine Order 505 and Uniform Shipping Laws (USL) Code
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- safety devices fitted to switchboard and other electrical systems, including fuses and circuit breakers
- sequence of required actions when power unit becomes overloaded
- shore power arrangements
- single and three phase alternating current (AC) power generation.

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:

- a commercial vessel with inboard diesel propulsion power of greater than or equal to 375 kW or appropriate engine and auxiliary system ashore
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>