



Australian Government

MARC017 Operate 240 to 440 voltage alternating current electrical systems

Release: 1

MARC017 Operate 240 to 440 voltage alternating current electrical systems

Modification History

Release 1. New unit of competency.

Application

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

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

WARNING: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

Pre-requisite Unit

Not applicable.

Competency Field

C - Equipment Operations

Unit Sector

Not applicable.

Elements and Performance Criteria

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 is selected and used according to organisational procedures
	2.2	Electrical systems are operated in a safe and controlled manner

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| | 2.3 | Performance of direct current (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 | Shut-down procedures are conducted according to manufacturer instructions and organisational procedures |
| | 3.2 | Operational records are completed according to organisational procedures |

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Electrical systems must

- alternators

- include:
- batteries and associated circuits
 - control circuits
 - fire detection
 - motors
 - starter circuits
 - switchboard

- Emergencies must include:
- failure of:
 - generator
 - emergency generator
 - fire
 - flooding

- Operational records must include:
- logbooks
 - maintenance records
 - operational orders from the organisation's safety management system
 - plant and equipment manufacturer instructions and recommended procedures
 - relevant maritime authorities documentation relating to operating electrical systems

Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4007A 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 MARC017 Operate 240 to 440 voltage alternating current electrical systems

Modification History

Release 1. New unit of competency.

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:
 - battery ampere-hours and efficiency
 - series and parallel configuration of battery supply
 - adding resistors in series and parallel, and calculating current
- connecting to shore power
- isolating electrical circuits
- maintaining records of operating and maintaining 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
- reading and interpreting:
 - manufacturer instructions for the operation of electrical systems
 - maritime regulations, rules and instructions
- recognising problems that may occur with electrical systems and taking appropriate preventative and remedial action
- recognising when performance of electrical systems is unsatisfactory or outside of specified limits and taking appropriate action
- starting emergency generator and supply switchboard where available
- using hydrometer
- using multi-meter 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:

- battery:
 - operation
 - charging circuits and hazards associated with charging batteries
 - 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
- faults associated with electrical systems and appropriate preventative and remedial action, and solutions
- 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 sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) 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 action when power unit becomes overloaded
- shore power arrangements
- single and three phase AC power generation.

Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

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

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

Links

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