



Australian Government

MARB011 Undertake maintenance of 240 to 440 voltage alternating current electrical systems

Release: 1

MARB011 Undertake maintenance of 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 perform establish, organise and implement a preventative and reactive maintenance program and capabilities on 240 to 440 voltage alternating current (AC) electrical systems on a vessel.

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 qualification requirements apply to 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

B - Equipment Checking and Maintenance

Unit Sector

Not applicable.

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1 Verify maintenance requirements	1.1 Regulatory and organisational requirements for electrical system maintenance program are identified and followed
	1.2 Specifications, diagrams and organisational procedures for electrical systems are checked for recommended maintenance
	1.3 Special requirements for electrical system maintenance are separated from adjustment and day-to-day maintenance schedules

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| | 1.4 | Maintenance system goals for electrical systems are outlined |
| | 1.5 | Maintenance plan and related work schedule for electrical systems are developed according to regulatory requirements and safety management system (SMS) |
| 2 Establish maintenance systems | 2.1 | Maintenance costs are identified and quantified |
| | 2.2 | Interruptions, processes and procedures are documented |
| | 2.3 | Internal and external maintenance providers are specified |
| | 2.4 | Maintenance plan is prepared to minimise negative impacts on production, costs, waste and the environment |
| | 2.5 | Approvals for maintenance plan are negotiated and confirmed |
| | 2.6 | Recordkeeping systems are developed and maintained |
| 3 Organise maintenance activities | 3.1 | Schedules and rosters are checked to verify time when maintenance process may be scheduled, including optimal timing for shut down |
| | 3.2 | Agreement from Master is obtained for timing of maintenance tasks to optimise maintenance process and minimise operational disruptions |
| | 3.3 | Detailed work plans are developed in line with schedules, availability of expertise and scheduling of resource availability |
| | 3.4 | Team members with required competencies are allocated to maintenance activities |
| | 3.5 | Consumables and equipment are secured to meet work plan requirements |
| | 3.6 | Externally sourced equipment, consumables and expertise are located and procured |
| | 3.7 | Contingency plans are prepared |
| | 3.8 | Maintenance schedules and procedures are effectively communicated to team |
| 4 Supervise maintenance tasks | 4.1 | Job specifications and maintenance tasks are communicated effectively to team members |
| | 4.2 | Maintenance and repair tasks are monitored to ensure they |

- satisfy system specifications
- 4.3 Work health and safety (WHS)/occupational health and safety (OHS) requirements are monitored and observed at all times
 - 4.4 Emergency equipment is made available and working order of this equipment is ensured
 - 4.5 Contingencies are managed to ensure quality of work is maintained and work is completed within agreed timeframe
- 5 Perform planned maintenance activities**
- 5.1 WHS/OHS risk control measures and procedures for carrying out work are followed
 - 5.2 Maintenance schedule and process compliance requirements are confirmed and work is appropriately sequenced according to job specification
 - 5.3 Appropriate person/s are consulted to ensure work is coordinated effectively with others
 - 5.4 Resources needed to conduct maintenance are obtained according to organisational procedures and are checked against job requirements
 - 5.5 Tools, equipment and testing devices needed to conduct maintenance are obtained according to organisational procedures and checked for correct operation and safety
 - 5.6 Live and operating system is tested or measured strictly according to WHS/OHS requirements and within established safety procedures
 - 5.7 Electrical equipment is checked as being isolated where necessary, strictly according to WHS/OHS requirements and within established safety procedures
 - 5.8 Electrical equipment to be maintained is inspected and evaluated for compliance with system specifications
 - 5.9 Noncompliant electrical equipment components are rectified or repaired according to system specifications
- 6 Perform breakdown maintenance**
- 6.1 Nature of breakdown is confirmed with appropriate personnel
 - 6.2 Extent of breakdown is evaluated and confirmed using diagnostic and troubleshooting techniques

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| | 6.3 | Restrictions are applied to operations, if necessary, and agreed to with the Master |
| | 6.4 | Electrical equipment is checked as being isolated where necessary, strictly according to WHS/OHS requirements and within established safety procedures |
| | 6.5 | Repair work is carried out according to system specifications |
| | 6.6 | Master is notified of completion of repair work and details are documented |
| 7 Monitor, adjust and report on implementation of maintenance plan | 7.1 | Maintenance tasks are monitored to ensure they are completed according to maintenance plan and statutory survey requirements |
| | 7.2 | Electrical systems are monitored to ensure achievement of planned outcomes |
| | 7.3 | Costs are monitored and controlled |
| | 7.4 | Adjustments are made to maintenance plan to take into account failure to achieve planned outcomes |
| | 7.5 | Reports are completed according to maintenance plan requirements and organisational procedures |
| | 7.6 | Recommendations to improve maintenance plan safety, efficiency and effectiveness are implemented under regular review of SMS |
| | 7.7 | Maintenance tasks are monitored to ensure they are completed according to maintenance plan and statutory survey requirements |

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 include one or more of the following:

- AC generators
- alarm systems
- batteries
- electrical motor starting circuits
- emergency electrical supply
- emergency generators
- generators
- power and lighting
- shore supply
- steering gear
- switchboards

Special requirements for electrical system maintenance include one or more of the following:

- breakdown maintenance
- periodic inspections and surveys

Maintenance tasks include one or more of the following:

- battery maintenance
- generator servicing
- replacing faulty wiring
- testing:
 - alarm systems
 - emergency generator
- power and lighting systems

Consumables and equipment include one or more of the following:

- replacement parts
- testing equipment
- tools and equipment rated for electrical work

Emergency equipment

- alarm systems

includes one or more of the following:

- emergency generator
- firefighting equipment
- lifesaving equipment
- pump operations

Nature of breakdown includes one or more of the following:

- failure of electricity generating systems
- generator failure

Restrictions include one or more of the following:

- stopping main engine
- stopping one generator
- switching to emergency power

Reports include one or more of the following:

- incident reports
- maintenance log
- operational orders from organisation SMS
- reports required under planned maintenance system
- survey reports

Unit Mapping Information

This is a new unit. This unit is equivalent to MARB4006A Undertake maintenance of 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 MARB011 Undertake maintenance of 240 to 440 voltage alternating current electrical 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 and performance criteria on at least one occasion and include:

- applying safety requirements throughout work sequence including the use of personal protective equipment (PPE)
- completing all work to specification
- developing effective planning documents
- ensuring correct requirements and details of maintenance of electrical systems and equipment
- implementing safe and environmentally responsible work practices in testing and maintenance activities
- locating, interpreting and applying manufacturer specifications for electrical systems and equipment
- operating AC systems and conducting operator preventive maintenance according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- operating electrical systems and equipment according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation providing high quality reports
- recognising electrical system faults and where necessary taking steps to make them immediately safe
- 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:

- AC systems not exceeding 440 voltage AC
- batteries (types, care and maintenance, hazards)
- care of electrical systems and equipment in general (fault recognition)
- charging systems:
 - alarms/indicators
 - regulators
- connecting batteries

- electric systems (above 240 V AC and up to 440 V AC)
- fault identification, location and safety implications
- operation and maintenance of starter motors, alternators and associated equipment
- personal safety
- protective devices on switchboards
- shore power connection
- use of fuses and circuit breakers (selection of correct capacity).

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