



Australian Government

MARB047 Undertake maintenance of 240 to 440 voltage alternating current electrical systems

Release: 2

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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 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 establish, organise and implement a preventative and reactive maintenance program and capabilities on 240 to 440 volt (V) alternating current (AC) electrical systems on a vessel.

It includes checking maintenance needs, setting up maintenance systems, planning maintenance activities, overseeing tasks, carrying out scheduled maintenance, handling breakdowns promptly, and monitoring and reporting on maintenance plans.

This unit of competency 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 qualification 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 direct current (DC) or above.

Seafarers seeking certification should check with AMSA.

Pre-requisite Unit

Not applicable.

Competency Field

B - Equipment Checking and Maintenance

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

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
- 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 shutdown

- 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 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 is 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 Non-compliant 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
 - 6.3 Restrictions are applied to operations, as 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

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 MARB011 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 MARB047 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
- completing records, including:
 - incident reports
 - maintenance logs
 - reports required under planned maintenance system
- 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 alternating current (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
- performing maintenance tasks, including:
 - battery maintenance
 - testing:
 - alarm systems
 - emergency alternator
 - power and lighting systems

- recognising electrical system faults and, where necessary, taking steps to make them immediately safe and initiate repair
- 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 volts (V) AC
- batteries, including types, care and maintenance, and hazards
- care of electrical systems and equipment in general including fault recognition
- charging systems, including:
 - alarms/indicators
 - regulators
- connecting batteries
- electric systems, including 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
- special requirements for electrical system breakdown/s, including:
 - isolation procedures
 - stopping alternator/s
 - stopping main engine/s
 - switching to emergency power
- use of fuses and circuit breakers, including selection of correct capacity.

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
- electrical systems, including:
 - AC alternator (above 240 V AC and up to 440 V AC)
 - batteries
 - electrical motor starting circuits
 - emergency electrical supply
 - power and lighting
 - shore supply
 - switchboards.

Links

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