



Australian Government

MARC015 Operate marine internal combustion engines and associated systems up to 1500 kW

Release: 1

MARC015 Operate marine internal combustion engines and associated systems up to 1500 kW

Modification History

Release 1. New unit of competency.

Application

This unit involves the skills and knowledge required to operate a marine internal combustion engine and associated systems up to 1500 kW 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.

This unit has links to legislative and certification requirements.

Pre-requisite Unit

Not applicable.

Competency Field

C - Equipment Operations

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 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 marine internal combustion engines and associated systems are completed prior to use according to manufacturer specifications and organisational procedures
2 Operate marine internal combustion engines and	2.1	Suitable personal protective equipment is selected and used according to organisational procedures
	2.2	Marine internal combustion engines and associated systems

associated systems	are operated in a safe and controlled manner
2.3	Performance of marine internal combustion engines and associated systems operations is monitored
2.4	Adverse sea and weather conditions that may impact on operating marine internal combustion engines and associated systems are identified and operational practices are adjusted to maintain safety of vessel and personnel
2.5	Faults or malfunctions are identified and recorded according to organisational procedures
2.6	Faults or malfunctions are rectified where possible and corrective actions are taken and recorded according to organisational procedures
2.7	Restrictions are applied to operations if necessary and are agreed to with the Master
2.8	Procedures to be undertaken in of emergencies are recognised and implemented
3 Complete operations	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.

Associated systems must include:

- air start
- control systems
- cooling system
- dual fuel systems
- exhaust systems
- lubrication systems

Monitored includes one or more of the following:

- conducting performance tests
- reading gauges and instruments
- responding to alarms

Emergencies must include:

- explosion
- failure or major fault in propulsion engines and associated control systems
- fire
- loss of:
- bridge control
- electrical supply
- propulsion power
- steering
- major breakdowns

Operational records must include:

- logbooks
- maintenance records
- operational orders from organisational safety management system
- plant and equipment manufacturer instructions and recommended procedures
- relevant maritime authorities documentation relating to operating marine internal combustion engines and associated systems

Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4005A Operate marine internal combustion engines and associated systems up to 1500 kW.

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 MARC015 Operate marine internal combustion engines and associated systems up to 1500 kW

Modification History

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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:

- carrying out necessary calculations associated with managing marine internal combustion engines and associated systems including calculating:
 - areas and volumes of various shapes and circumference of circles
 - calibration tables
 - lubricating oil and fuel oil consumption, rate of fuel consumption (RFC), specific fuel consumption (SFC), effects on RFC and fuel requirements due to change in vessel speed or voyage deviations
 - relationship between vessel speed and fuel consumption, including the meaning of economical revolutions per minute (RPM) and its application
 - tank capacities and pumping capacities for filling and emptying
- maintaining records of operating and maintaining marine internal combustion engines and associated systems, and any related safety incidents
- reading and interpreting:
 - manufacturer instructions for operating marine internal combustion engines and associated systems
 - maritime regulations, rules and instructions
- reading and monitoring various gauges and instruments to evaluate the performance of marine internal combustion engines and associated systems
- recognising problems that may occur with marine internal combustion engines and associated systems, and taking appropriate preventative and remedial action
- recognising when performance of marine internal combustion engines and associated systems is unsatisfactory or outside of specified limits and taking appropriate action.

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:

- characteristics of marine internal combustion engines and associated systems including operational limits
- control systems
- cooling water system and components

- crankcase explosions and appropriate preventative and remedial action and solutions
- dangers associated with operating shipboard marine internal combustion engines and associated systems, and related hazard prevention strategies
- engine protection arrangements
- force diagrams
- fuel system including pumps and injectors
- lubricating oil systems and components
- materials and construction techniques of marine internal combustion engines and associated systems
- methods for controlling and managing the operation of shipboard marine internal combustion engines and associated systems
- own ability and limits to rectify irregularities and faults
- pollution control measures under relevant local, state, territory and commonwealth legislation
- problems associated with marine internal combustion engines and associated systems, and appropriate preventative and remedial action and solutions
- procedures for monitoring and evaluating performance of marine internal combustion engines and associated systems
- relationship between vessel speed and fuel consumption, including the meaning of economical RPM and its application
- relevant sections of state and territory maritime regulations and NSCV
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- requirements for emission control from internal combustion engines under the International Convention for the Prevention of Pollution from Ships (MARPOL)
- sequence of required action when there is a major fault on main propulsion engine
- surroundings and changes to these surroundings
- technological changes in engine and control system designs
- turbocharging systems.

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>