



Australian Government

**Assessment Requirements for MARC027
Contribute to the operation of engine
equipment and associated propulsion plant**

Release: 1

Assessment Requirements for MARC027 Contribute to the operation of engine equipment and associated propulsion plant

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, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices, including:
 - entry into pump-room, fuel tanks and other confined spaces on a vessel
 - hazards involved in engines, propulsion plan and auxiliary equipment operation
 - pollution control
- attending to appropriate level of detail in recordkeeping
- avoiding polluting the environment
- identifying problems that occur during the operation of engines on vessels
- interpreting and following procedures for the operation, monitoring and evaluation of the performance of engines on vessels
- operating bilge and ballast systems under the supervision of the officer in charge of the engineering watch, according to manufacturer instructions and organisational procedures
- producing reliable documentation
- reading and interpreting:
 - equipment performance readings and instrumentation
 - lock out and tagging procedures
 - safety data sheets (SDSs)/material safety data sheets (MSDSs)
- recognising and reporting electrical hazards and unsafe equipment
- selecting and using tools required for operating, monitoring and evaluating the performance of engines on vessels.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles and functions of machinery space monitoring and alarm systems

- basic principles and operational characteristics of:
 - auxiliary boilers and associated equipment
 - controllable pitch propellers (CPP)
 - direct drive propulsion systems
 - internal combustion engines
 - jet propulsion
 - marine gas engines
 - reduction boxes
 - steam turbines, gearing and associated equipment as they apply to auxiliary systems
 - thrusters (Z pellers, azimuth, tunnel)
 - Voith Schneider Units
- basic principles of:
 - detection, identification and repair of faults
 - engine cooling and lubrication
 - fuel systems including heavy fuel oil (HFO) and diesel
 - marine control systems
- basic principles of operation of hydraulic and electronic governors and overspeed trips
- causes of electric shock and precautions to be observed to prevent shock
- hazards and problems that can occur during the operation and performance of engines, propulsion plant and auxiliary machinery and appropriate preventative and remedial actions and solutions
- methods of providing air for combustion in the vessel engine room
- national and international regulations, International Maritime Organization (IMO) Conventions and Codes, class rules applicable to the operation and performance evaluation of engines, propulsion plant and auxiliary machinery on vessels
- nature and causes of typical malfunctions and/or poor performance of engines, propulsion plant and auxiliary machinery, and the available methods for their detection and rectification
- procedures for:
 - carrying out performance evaluation of engines, propulsion plant and auxiliary machinery
 - testing and treating auxiliary boiler water, machinery cooling water and lubricating oil
- purpose of safe isolation procedures and application of lock out tags
- relevant WHS/ OHS requirements, work practices and pollution control regulations and policies
- rights and responsibilities of individuals about lock out and tagging of plant and equipment
- safe function, operation and maintenance of bilge and ballast systems
- safe operation of equipment including valves and pumps
- safe use and operation of electrical equipment including safety precautions before commencing work or repair, isolation procedures, emergency procedures and different voltages on board
- safety, environmental and hazard control precautions and procedures relevant to the operation and performance of engines, propulsion plant and auxiliary machinery
- shafting systems, oil fill stern tube, pedestal bearings, thrust bearings

- preventative strategies for scavenge and uptake fires, and starting air-line, crankcase and gearbox explosions
- typical SDSs/MSDSs, vessel and machinery specifications, machine drawings, operation manuals, electrical and control circuit diagrams.

Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

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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.

Assessment must occur in workplace operational situations where the operation of engine equipment and associated propulsion plant under the direction of the officer in charge of the engineering watch can be demonstrated. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, materials, plant and equipment that replicate and are currently used in industry including:
 - alarm systems
 - auxiliary boilers and associated equipment
 - auxiliary machinery
 - fuel systems
 - gas turbines
 - hydraulic and electronic governors
 - internal combustion engines
 - marine control systems
 - overspeed trips
- personal protective equipment 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>