



Australian Government

**Assessment Requirements for MARL059
Demonstrate basic knowledge of marine
steam turbines and main boilers**

Release: 1

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Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

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:

- accessing diagnostic information related to marine steam turbines
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions to problems that can occur when operating steam propulsion plant and associated systems on a steam vessel
- identifying and interpreting diagnostic information, and performing mathematical calculations related to operating, repairing and maintaining marine steam turbines
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, maintaining and repairing marine steam turbines.

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:

- auxiliary machinery, including:
 - lube oil supply pump and system
 - main boiler forced draught fan
 - main condensate extraction pump and air ejector
 - main condenser
 - main cooling water circulating pump
 - main feed pump
 - main fuel oil supply pump and system

- basic principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
 - construction and operation of main and auxiliary steam turbines
 - methods of turbine control, including safety devices
 - procedures for emergency operation of a steam turbine
 - Rankine cycle
 - symptoms, causes, effects, and actions to be taken with defects of auxiliary steam turbines
- effective verbal, written and visual communication strategies
- established engineering practice and procedures for operating shipboard steam propulsion plant and associated systems in warm-through, manoeuvring, start-up, normal running, and emergency shutdown (ESD) situations
- fires, including:
 - blow back
 - economiser
 - explosions
 - low water level
 - uptake
- fundamental principles of steam propulsion systems and boilers
- hazards and problems that can occur when operating steam propulsion plant and associated systems, and appropriate preventative and remedial action
- marine steam turbines, including:
 - impulse
 - reaction
- methods of lubricating the principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes, and actions to be taken with such faults
- operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- procedures for reading, interpretation of readings and indications of the performance of steam propulsion plant and associated systems
- safety devices, including:
 - axial movement
 - gland temperature
 - lube oil pressure
 - lube oil temperature
 - remote stops
 - safety valves
 - vacuum condenser pressure
 - vibration
- steam distribution systems, including:
 - auxiliary exhaust steam range

- auxiliary superheated steam range
- bled steam systems
- superheated main steam range
- types, properties, tests, applications and treatment of fuels, lubricants, and solvents/chemicals used onboard a steam vessel, including a basic understanding of the working principles, construction, maintenance and safe operation of centrifuges, filters, and other treatment devices
- typical operating precautions for steam propulsion plant and associated systems to ensure operational performance is in compliance with bridge orders, technical specifications, survey requirements and established safety and anti-pollution rules and regulations
- units of measurement
- warming-through procedures, including:
 - ensuring air vent is open
 - minimising thermal shock
 - shutting down
 - warming up according to manufacturer instructions
- WHS/OHS legislation and policies.

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 Organisations 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 industry approved marine operations site or 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:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- diagrams, specifications and other information required for performing basic calculations related to marine steam turbines
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

Links

Companion Volume implementation guide can be found in VetNet -

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