



**Australian Government**

**Assessment Requirements for MARL052  
Demonstrate advanced knowledge of  
marine steam turbines and main boilers**

**Release: 1**

# **Assessment Requirements for MARL052 Demonstrate advanced knowledge of marine steam turbines and main boilers**

## **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 complex problems that can occur during operating steam propulsion plant and associated systems on a steam vessel
- identifying and interpreting complex diagnostic information and performing complex 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
- imparting advanced knowledge and ideas verbally, in writing and visually
- performing accurate and reliable calculations and producing accurate and reliable information.
- reading and interpreting complex manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, repairing and maintaining 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:

- accessories, including:
  - accessory gear
  - lube oil:
    - coolers
    - filters
    - pumps

- starting devices
- 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
  - symptoms, causes and effects of defects of auxiliary steam turbines and actions to be taken
- boiler operation, maintenance and performance, including:
  - boiler water level control methods
  - boiler water testing and treatment
- changes in feed system that occur during fluctuating loads
- construction and operation of feed system
- construction and operation of high-pressure turbines
- construction, operation and repair of high-pressure water tube boilers
- design features and operative mechanism of marine steam turbine and associated auxiliaries, including:
  - material selection and design features of steam turbine
  - material selection and design features of steam turbine gearbox
- energy balance for a steam turbine plant
- established engineering practice and procedures for operating shipboard steam propulsion plant and associated systems in warm-through, manoeuvring, start-up, normal running, emergency and shutdown situations
- fundamental principles of steam propulsion systems and boilers
- hazards and problems that can occur during operation of steam propulsion plant and associated systems, and appropriate preventative and remedial action
- high-pressure water tube boilers and ancillary equipment
- methods of lubricating 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
- operation of marine steam turbines
- operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- 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
  - symptoms, causes and effects of defects of auxiliary steam turbines and actions to be taken
- procedures for reading and interpreting readings and indications of performance of steam propulsion plant and associated systems

- requirements for feed water treatment for high-pressure water tube boilers
- simple cycle marine gas turbine
- trip and cut-outs, including:
  - axial displacement
  - bearing high temperature
  - high condenser level
  - loss of vacuum
  - over speed
  - vibration
- turbine control systems, including:
  - bridge control
  - emergency operation
  - hydraulic control
  - local control
- turbine operation, maintenance and performance
- turbine-gearing arrangements and performance
- turbine vibration, including:
  - axial
  - torsional
  - transverse
- types, properties, tests, applications and treatment of fuels, lubricants and solvents/chemicals used onboard a steam vessel, including 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
- ways of improving plant efficiency
- WHS/OHS requirements and work practices.

## 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 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
- 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>