



Australian Government

Assessment Requirements for MARL053 Demonstrate advanced knowledge of ship operations and maintenance

Release: 3

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Modification History

Release 3. This is the third release of this unit of competency in the MAR Maritime Training Package:

- Minor change to unit application.

Release 2. This is the second release of this unit of competency in the MAR Maritime Training Package:

- Minor grammatical correction to numbering in performance criteria.

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 information required in routine and emergency situations
- 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
- detecting and identifying cause of machinery malfunctions and correct faults, including:
 - detecting machinery malfunctions, location of faults and actions to prevent damage
 - inspecting and adjusting equipment
 - non-destructive examination
- ensuring currency of relevant legislative and regulatory knowledge
- ensuring safe working practices in accordance with ship safety management system (SMS)
- explaining advanced concepts of ship operation and maintenance
- identifying hazards and risks, and determining appropriate ways of responding to hazards, malfunctions and emergency situations and daily operations
- identifying methods and procedures needed to perform duties, such as preparing for dry docking and statutory surveys and other duties, on commercial vessels
- identifying, interpreting and processing complex numerical and graphical information required to analyse engineering functions and shipboard engineering-related problems in routine and emergency situations
- imparting knowledge and ideas through verbal, written and visual means
- planning and organising the resources needed to establish and maintain SMS on a tanker or

- gas carrier
- reading and interpreting legislation and regulations related to maritime operations
- reading and interpreting written instructions, procedures and information relevant to duties of an Engineer Class 2.

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:

- areas covered by classification and surveys, including:
 - automation
 - boilers/pressure vessels
 - cargo gear
 - hull
 - machinery
 - specific notations for cargo pumping arrangements for tankers
 - tail shaft
- areas of a vessel covered by statutory surveys, including links with classification society requirements for endorsement of class certificates
- Australian maritime legislation key provisions, including:
 - Australian Maritime Safety Authority (AMSA) legislation
 - levy legislation
 - marine pollution legislation
 - navigation legislation
 - other relevant legislation
 - shipping industry legislation
 - shipping registration legislation
- classification societies
- classification surveys, including:
 - dry dock and in water bottom surveys
 - hull work
 - machinery
 - pipe work
 - propellers
 - pumping systems
- Code of Safe Working Practice for Australian Seafarers key provisions, including:
 - anchoring, docking and mooring
 - carriage of dangerous goods
 - entering and working in enclosed or confined spaces
 - general duties and responsibilities

- general provisions
- manual lifting and carrying
- painting
- permit to work systems
- reporting of accidents
- safe access to ship
- safe movement about the ship
- safety in living accommodation
- shipboard:
 - emergencies and emergency equipment
 - health and safety
 - specific vessel types
 - tools and materials
 - upkeep of wire and fibre ropes
 - welding flame cutting and other hot work
- working:
 - aloft and over the side
 - in galleys, pantries and other food handling areas
 - in machinery spaces
 - with dangerous and irritating substances and radiations
 - with electricity and electrical equipment
- communication methods, including:
 - checklists
 - rate
 - safety
 - stock methods
 - two-way radio
- dry docking:
 - procedures
 - responsibilities of engineering staff
- enclosed spaces
- emergency situations, including:
 - dangerous goods
 - disposal of dangerous/toxic materials
 - firefighting
 - first aid
 - hazard reduction
 - reporting
- Flag State responsibilities
- heavy items, including:

- hatches
- large movable structures
- stern doors
- hierarchy and organisational structure of shipboard personnel
- inert gas system for tankers
- inspection and maintenance procedures for hull and machinery items in dock, including:
 - hull coating systems
 - measurement and evaluation of clearances
- International Maritime Dangerous Goods (IMDG) Code requirements and principles, including:
 - dangerous goods packaging/tanks which are of appropriate strength and which will prevent goods escaping
 - emergency response advice for dangerous goods involved in a fire or spillage on board ship
 - grouping dangerous goods together based on hazards they present in transport (classification)
 - hazard warning labels and other identifying marks to identify dangerous goods in transport
 - principles for ensuring dangerous goods that will react dangerously together are kept apart
 - principles for where to place dangerous goods onboard ship to ensure safe transport
 - standard documentation to be provided when dangerous goods are being transported
- international maritime law, conventions and regulations, including:
 - certificates and other documents to be carried onboard ships by international conventions
 - International Convention for the Prevention of Pollution from Ships (MARPOL)
 - International Convention for the Safety of Life at Sea (SOLAS)
 - International Convention on Load Lines 1966
 - International Convention on Standards of Training, Certification and Watchkeeping (STCW) for Seafarers
 - international health regulations
 - international instruments affecting safety of ships, passengers, crew or cargo
 - International Safety Management (ISM) Code
 - Maritime Labour Convention (MLC) 2006
- ISM Code related to safe work practices, operation and maintenance, including:
 - managing safe and effective maintenance and repair procedures
 - planning maintenance, including statutory and class verifications
 - planning repairs
- key international and Australian Standards relating to shipping
- key shipping authorities and organisations
- maintenance and repairs, including:
 - hull, pumping systems, propellers, machinery and other items satisfying maintenance of

class

- lifting and lifesaving equipment
- maintenance strategies relating to classification surveys
- maritime communication techniques
- methods of minimising and controlling internal and external hull corrosion, including:
 - bacterial corrosion of bilges and fuel tanks
 - cathodic protection
 - coating systems
 - surface preparation techniques
- methods of performance testing shipboard pumping systems, including:
 - bilge and ballast systems
 - hydraulic deck machinery
- operational procedures to minimise and control flooding, including:
 - actions to ensure watertight integrity of ship
 - rules relating to watertight doors
- other systems of spaces outside engine room, including:
 - holds
 - pump rooms
 - spaces forward of the collision bulkhead
- planned maintenance systems, including guidelines for classification society approval of substitution for continuous machinery surveys
- Port State Control (PSC)
- properties of hull grades of steel including:
 - repair techniques and limitations
 - weld ability
 - welder qualification tests
- regulatory framework impacting on commercial shipping operations
- relevant sections of maritime regulations, codes and conventions related to tankers and gas carriers
- repair and maintenance methods for hull work, pipe work and pumping systems, machinery, propellers and other items to satisfy maintenance of class position
- safe practices for working with lifting gear
- safe working practices associated with lifting and lifesaving equipment
- safe working practices in enclosed or confined spaces
- shipboard enclosed space hazards, including:
 - engulfment
 - explosion
 - fire
 - lack of oxygen
 - re-entry of compartments after a major fire
 - release of fixed firefighting medium

- toxic gases
- shipboard pumping, including:
 - bilge and ballast systems, including predictive health monitoring
 - hydraulic deck machinery
 - prevention of pollution of the sea by oil
 - sewage and sludge
- shipboard vibration
- solutions, including:
 - damping
 - design
 - detuning
 - modification of ship:
 - operation
- specific notations
- stability requirements for routine and emergency dry docking, including stability assessment for docking duration
- statutory survey requirements
- survey methods, including:
 - alternative
 - continuous
 - special surveys
- terminology relating to the structure, capacities and operations of various types of tankers and gas carriers
- terms, including:
 - amplitude
 - anti-node
 - frequency
 - mode
 - node
 - resonance
- types of ships and key features, including:
 - bulk carrier
 - container
 - general dry cargo
 - passenger
 - ro-ro
 - tanker or gas carrier
- vessel stability and loss of metacentric height (GM), including:
 - derrick hook loads
 - free surface effect

- watertight integrity
- 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 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 Guides are found in VETNet -

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