



Australian Government

Assessment Requirements for MARL050
Demonstrate advanced knowledge of
marine diesel engines and systems

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 diesel engines and systems
- 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
- explaining operation of marine diesel engines and systems, and imparting complex information and ideas verbally, in writing and visually
- identifying and applying relevant solutions for addressing problems associated with marine diesel engines and systems
- identifying and interpreting complex diagnostic information and performing mathematical calculations related to operating, repairing and maintaining marine diesel engines and systems
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems
- reading and interpreting manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, repairing and maintaining marine diesel engines and systems.

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:

- appropriate actions to be taken with common cooling, including:
 - contamination
 - different cooling water treatments
- causes of vibration
- combustion diagnostic equipment faults
- common service faults, actions to rectify faults, emergency operation and isolation procedures
- cooling systems for main and auxiliary diesel engines

- crankcase and air-line explosions, scavenge and uptake fires
- design features and operating mechanism of marine diesel engine and associated auxiliaries, including:
 - combustion chamber components of diesel engine
 - fuel injection equipment of diesel engine
 - operative mechanism of diesel engine systems
 - piston rings, compatibility to cylinder liner and cylinder lubrication employed in a diesel engine
 - running gear of diesel engine
 - structure of diesel engine
- design features of turbochargers and charge air coolers, including:
 - bearing types
 - materials
- design features and operative mechanism of marine diesel engine and associated auxiliaries, including:
 - material selection and design features of the:
 - combustion chamber components of diesel engine
 - diesel engine system
 - fuel injection equipment of diesel engine
 - piston rings, compatibility to cylinder liner and cylinder lubrication employed in a diesel engine
 - running gear of diesel engine
 - structure of diesel engines
- diesel engines, including:
 - components
 - condition monitoring
 - engine system diagnostics
 - lubrication requirements
 - lubrication systems
 - propulsion and power generation
 - starting and manoeuvring
- diesel fuel systems
- fuel injection and pressure charging systems
- fuel systems, including:
 - conventional, low-inertia and dual-fuel (oil fuel/gas) injectors
 - fuel line pulsation damping devices
 - leakage protection
 - uni-fuel and dual-fuel systems (high/medium viscosity fuel types)
- hazards, including:
 - acids

- chemicals
- defective or bypassed machinery protective devices
- defective or inappropriately adjusted exhaust systems
- enclosed spaces
- flammable liquids under pressure
- hydrocarbons
- leaking oil and fuel
- lifting heavy components both unaided and with lifting gear
- manoeuvring systems of diesel engines
- methods of:
 - component fabrication and reclamation, including:
 - ceramics
 - composite
 - forged
 - laser-hardening
 - plasma-spraying
 - welded
 - medium and slow cylinder lubrication, including:
 - optimisation
 - running-in requirements
 - speed and load-dependant lubrication
- normal operating temperatures, pressures and flow paths, including:
 - bore cooling techniques
 - honeycomb techniques
 - strong-back techniques
- multi-engine propulsion arrangement
- pressure charging diesel engines
- principles of diesel engine operation, including precautions and procedures
- relevant diagrams, including light spring diagrams
- scavenge and uptake fires, air line, crankcase and gearbox explosions
- sources of contamination, including bacterial infection
- starting and reversing methods of diesel engine
- turbocharger operation
- WHS/OHS requirements and safe work practices, including:
 - diesel engine control and safety
 - diesel engine emergency operation
 - isolating main and propulsion diesels, including:
 - identifying hazards
 - minimising hazards
 - machinery in enclosed spaces, including:

- handling heavy components
- using hydraulic tools
- safe working practices associated with diesel engine maintenance, operation and repair.

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:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials, relevant personnel and 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>