Australian Government

MARC4001A Manage a propulsion unit using appropriate engine systems and support services

Release 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

MARC4001A Manage a propulsion unit using appropriate engine systems and support services

Modification History

Release 1
This is the first release of this unit.
This unit replaces and is equivalent to TDMMC607B Manage a propulsion unit using the appropriate engine systems and support services.

Unit Descriptor

This unit involves the skills and knowledge required to operate a propulsion unit using appropriate engine systems and support services according to technical specifications and safe operating limits.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Prepare for operation	1.1	Routine pre-operational checks of ***propulsion unit, engine systems and support services*** are completed prior to use according to manufacturer specifications and organisational procedures
	1.2	Propulsion unit, engine systems and support services are calibrated or set up correctly
	1.3	Faults or malfunctions are identified and reported according to organisational procedures
	1.4	Work health and safety (WHS)/occupational health and safety (OHS) hazards in the work area are identified and risk is assessed and reported according to organisational procedures
2 Operate propulsion unit, engine systems and support services	2.1	Risks to self, others and the environment are identified according to organisational procedures
	2.2	Suitable personal protective equipment is selected and used according to organisational procedures
	2.3	Controls of propulsion unit, engine systems and support services are operated in a safe and controlled manner
	2.4	Performance and efficiency of propulsion unit, engine systems and support services operations is monitored
	2.5	Safe operational practices are used to anticipate and control hazards
	2.6	Adverse sea and weather conditions that may impact on operation of propulsion unit, engine systems and support services are identified and operational practices are adjusted to maintain safety of vessel and personnel
	2.7	Procedures to be undertaken in the event of ***emergencies*** are recognised and implemented
3 Complete operations and check propulsion unit, engine systems and support services	3.1	Shut-down procedures are conducted according to manufacturer instructions and organisational procedures
	3.2	Malfunctions, faults, irregular performance or damage to propulsion unit, engine systems and support services are reported according to organisational procedures
	3.3	Propulsion unit, engine systems and support services are cleaned and secured according to organisational procedures
	3.4	***Operational records*** are completed according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out necessary calculations associated with managing propulsion unit
- Communicate effectively with other personnel
- Keep records of monitoring and operation of safety and fire detection/suppression equipment, and any required remedial action
- Maintain records of operation and maintenance of propulsion unit, ancillary power units, equipment and any related safety incidents
- Monitor and evaluate performance of propulsion unit, ancillary power units and equipment
- Read and interpret:
  - manufacturer instructions for operation of propulsion systems and auxiliary systems
  - maritime regulations, rules and instructions
- Recognise problems that may occur with remote control of propulsion unit, ancillary power units and equipment, and take appropriate preventative and remedial action
- Recognise when performance of propulsion unit or ancillary power units and equipment is unsatisfactory or outside specified limits and take appropriate action
- Work collaboratively with other shipboard personnel and passengers during vessel operations

Required Knowledge:

- Characteristics of propulsion units, ancillary power units and equipment including operational limits, vessel stopping distances and turning circles at various draughts, speeds and conditions of loading
- Dangers associated with operation of shipboard ancillary power units and related hazard prevention strategies
- Marine engineering terms
- Methods for controlling and managing operation of shipboard propulsion units, ancillary power units and equipment
- Principles of operation and control of various shipboard emergency systems
- Problems associated with remote control of propulsion unit, ancillary power units and equipment and appropriate preventative and remedial action and solutions
- Procedures for monitoring and evaluating performance of propulsion unit, ancillary power units and equipment
- Relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code
- Relationship between vessel speed and fuel consumption, including meaning of economical revolutions per minute (RPM) and its application
- Relevant WHS/OHS legislation and policies

- Requirements for waste management and control systems under the MARPOL Convention
- Sequence of required action when power unit becomes overloaded

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working as part of a team
- attention to appropriate level of detail in recordkeeping
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- appropriate sized vessel or simulator where managing a propulsion unit using appropriate engine systems and support services may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing a propulsion unit using appropriate engine systems and support services
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for

Holistic assessment with other units relevant to the industry

assessment	sector, workplace and job role is recommended. In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge. Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Propulsion unit and engine systems must include:	• Ancillary systems and controls • Bow and stern thrusters units • Controllable pitch propellers (CPP) • Diesel engines • Engine systems and controls • Gearing systems • Hydraulic systems and controls • Performance indicators • Power generating units and controls • Propeller shafting arrangements • Pumps and pumping systems • Safety alarm systems • Speed and fuel consumption indicators • Steering gear
Support services may include:	• Air conditioning systems • Air starting systems • Bilge systems • Cooling water systems • Fire detection and suppression systems • Fuel pumps, lines and tanks • Lubrication systems • Refrigeration systems • Steering gear systems • Waste management and pollution control systems • Water pumping systems

Emergencies must include:	• Fire or explosion
	• Flooding
	• Loss of:
	  • propulsion
	  • electrical power
	  • steering

Operational records must include:	• Instructions of relevant maritime authorities • Log books • Operational orders from the organisation's safety management system • Plant and equipment manufacturer instructions and recommended procedures

- Relevant sections of state and territory maritime regulations, NCSV and USL Code related to operation of propulsion plants and ancillary equipment

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations