



Australian Government

MARC024 Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment

Release: 1

MARC024 Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment

Modification History

Release 1. New unit of competency.

Application

This unit involves the skills and knowledge required to operate and perform basic maintenance on a reciprocating steam engine up to 750 kW nominal propulsion power according to relevant workplace practices and codes of practice. It includes operating controls, monitoring performance and maintaining operational condition of reciprocating steam engines and steam auxiliary equipment during use.

This unit applies to engine workers working in the maritime industry as a Marine Engine Driver Steam.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Not applicable.

Competency Field

C – Equipment Operations

Unit Sector

Not applicable.

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1 Prepare vessel for sea

- | | |
|-----|--|
| 1.1 | Spares and stores on board are checked to ensure those required for proposed voyage are available |
| 1.2 | Personal protective equipment (PPE) is selected for use |
| 1.3 | Hazardous materials are stowed and managed according to regulatory and organisational requirements |
| 1.4 | Work health and safety/occupational health and safety (WHS/OHS) hazards and potential hazards in engine room |

- are identified and corrective action is taken according to organisational practices
- 1.5 Pre-start checks are conducted on machinery and equipment according to organisational procedures
 - 1.6 Means of communication between bridge and engine room are tested
 - 1.7 Engines are started according to vessel procedures and organisation safety management systems (SMS)
- 2 Operate and monitor steam engine and steam auxiliary machinery**
- 2.1 Marine steam plant components are identified and operated according to organisational operating procedures
 - 2.2 Steam engine handling techniques are interpreted and applied to eliminate or minimise risk of injury to personnel or damage to equipment
 - 2.3 Steam plant controls are identified and operated safely according to organisational procedures and technical specifications
 - 2.4 Steam engine auxiliary equipment is monitored and operated to maintain optimum running conditions
 - 2.5 Operational faults are recognised, assessed and rectified according to organisational procedures
 - 2.6 Hazards and potential hazards are recognised and interpreted, and appropriate initiatives and action is taken to minimise risk to personnel and equipment according to workplace procedures and applicable regulatory requirements
 - 2.7 Operating log is maintained clearly and accurately according to statutory requirements
- 3 Shut down steam engine**
- 3.1 Engine is shut down according to vessel procedures and organisation SMS
 - 3.2 Steam auxiliary systems are shut down according to vessel procedures and organisation SMS
 - 3.3 Documentation is maintained according to workplace and organisational requirements
- 4 Carry out maintenance of steam plant**
- 4.1 Maintenance requirements are identified, repairs are carried out and reported according to workplace procedures
 - 4.2 Engine and auxiliary equipment is regularly inspected and

maintained for maintenance according to statutory requirements and workplace procedures

- 4.3 Steam plant maintenance schedule is developed and implemented according to organisational planned maintenance system

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- | | |
|--|---|
| Personal protective equipment includes one or more of the following: | <ul style="list-style-type: none">• chemical resistant gloves and apron• ear protection (muffs or plugs)• eye protection• fire-resistant clothing• hard hat head protection• respiratory devices• thermally insulated gloves• working protective gloves |
| Hazards and potential hazards include one or more of the following: | <ul style="list-style-type: none">• chemical hazards• excessive noise• hot exposed pipes• lack of machinery guards• leakage of:<ul style="list-style-type: none">• fuel• gas• manual handling hazards• obstructions and defects in work area |

	• poor illumination of work area • rubbish and combustibles in work area • thermal hazards
Pre-start checks must include:	• checks of cooling water supply and system • essential fittings • firefighting equipment • fuel supply/heat source system • identifying and managing hazards and maintenance problems • operation and position of steam engine valves • selecting PPE
Means of communication includes one or more of the following:	• bell systems • telegraphs • voice pipe
Marine steam plant components include one or more of the following:	• boiler controls and safety devices • condensers • cylinder cocks • economisers • feed water controls • feed water heaters • lever driven long stroke feed pump • lubricators • operational controls • short stroke pump • steam plant instrumentation (gauges) • vacuum pumps (air pumps) • valve gear
Steam engine auxiliary equipment includes one or more of the following:	• blower • feed water pump • generator • injectors • valves • water treatment systems • whistle
Operating log includes one or more of the following:	• chemical treatment • maintenance/repair requirements • status and operation • test results • time in use
Documentation includes one or more of the following:	• emergency procedures instructions • maintenance notices, records and requests • operational instructions, policies and procedures, records and

- Maintenance requirements include one or more of the following:
- user log books
 - bilge pumps
 - cooling water valves
 - gauge glasses
 - safety valves

Unit Mapping Information

This unit replaces and is equivalent to MARC3003A Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment.

Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

Assessment Requirements for MARC024 Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment

Modification History

Release 1. New unit of competency.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- carrying out lubrication processes on an item of steam plant
- communicating effectively with others when operating and monitoring performance of an item of steam plant
- completing documentation related to operating and monitoring performance of an item of steam plant
- identifying and assessing steam plant defects and deficiencies, and taking appropriate action to report, isolate, repair or replace identified defective equipment according to workplace procedures
- implementing contingency plans for emergency situations
- monitoring performance of an item of steam plant
- operating an item of steam plant
- providing required amount of detail in reports and recordkeeping
- reading and interpreting instructions, procedures, information and signs relevant to operating and monitoring an item of steam plant
- recognising problems that may arise when operating and monitoring an item of steam plant and taking appropriate action
- selecting and using required personal protective equipment (PPE) that conforms to industry and WHS/OHS standards.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- own ability and limits to rectify irregularities and faults
- applicable legislation relating to steam plant and nationally approved compliance codes and/or guidelines and codes of practice
- basic principles of steam plant operation, monitoring devices and auxiliary systems
- lubricants including open steam engine oils, enclosed crankcase steam engine oils, compounded steam cylinder oils and non-compounded steam cylinder oils
- methods for:
 - adjusting controls to maximise efficient and safe running
 - operating and monitoring performance of auxiliary steam plant equipment
 - identifying equipment defects and assessing them for appropriate action
- PPE required when operating an item of steam plant and procedures for its use
- procedures for:
 - operating and monitoring an item of steam plant
 - managing safety incidents and hazardous situations that may arise when operating and monitoring performance of an item of steam plant
 - maintaining, cleaning, lubricating and servicing an item of steam plant
- procedures to be followed in an emergency when operating an item of steam plant
- relevant licensing, legislative, regulatory or certification requirements
- relevant WHS/OHS and environmental procedures and regulations
- requirements for completing relevant documentation during and after operation and monitoring of performance of an item of steam plant
- steam plant controls, instruments and indicators and their purpose, location and use
- typical problems that can occur with an item of steam plant and related action that should be taken to repair, isolate, replace, report and record faulty equipment.

Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

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.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where operating and maintaining a steam engine up to 750 kW and steam auxiliary equipment can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals

- tools, equipment and personal protective equipment currently used in industry when operating and maintaining a steam engine

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

Links

Companion Volume implementation guides are found in VETNet -

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