



**Australian Government**

# **MARC023 Operate and maintain a boiler**

**Release: 1**

# MARC023 Operate and maintain a boiler

## 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 boiler according to relevant workplace practices and codes of practice. It includes operating a boiler, monitoring performance and maintaining its operational condition 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 Select and use personal protective equipment**

1.1 Personal protective equipment (PPE) is selected for use according to statutory requirements and workplace procedures

1.2 Functions that require use of personal PPE are selected to enable function to be risk assessed

**2 Carry out pre-operational safety checks**

2.1 Boiler components are identified and operated according to organisational operating procedures

2.2 Boiler pre-operational safety checks are conducted according to statutory requirements and standard operating procedures

- |                                                            |     |                                                                                                                                                           |
|------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                            | 2.3 | Maintenance requirements are identified and reported according to workplace procedures                                                                    |
| <b>3 Maintain health and safety standards in work area</b> | 3.1 | Hazards and potential hazards in work area are identified according to statutory requirements and workplace procedures                                    |
|                                                            | 3.2 | Hazards are reported according to statutory requirements and workplace procedures                                                                         |
|                                                            | 3.3 | Prevention/control measures are selected according to organisational practice                                                                             |
|                                                            | 3.4 | Boiler chemicals are stored and handled according to statutory requirements, manufacturer recommendations and workplace procedures                        |
| <b>4 Operate and monitor boiler</b>                        | 4.1 | Boiler is started and brought online safely, according to statutory requirements, workplace procedures and organisational safety management systems (SMS) |
|                                                            | 4.2 | Operating status of boiler is monitored according to statutory requirements, workplace procedures and organisational SMS                                  |
|                                                            | 4.3 | Boiler water quality tests are conducted according to workplace procedures and organisational SMS                                                         |
|                                                            | 4.4 | Boiler water is adjusted as a result of tests, to meet manufacturer recommendations and workplace criteria                                                |
|                                                            | 4.5 | Operating log is maintained clearly and accurately, according to statutory requirements                                                                   |
| <b>5 Shut down boiler</b>                                  | 5.1 | Boiler is shut down according to statutory requirements, workplace procedures and organisational SMS                                                      |
|                                                            | 5.2 | Documentation is maintained according to workplace and organisational requirements                                                                        |
| <b>6 Carry out routine maintenance on boiler</b>           | 6.1 | Maintenance requirements are identified and reported according to workplace requirements                                                                  |
|                                                            | 6.2 | Boiler is cleaned internally and externally according to statutory requirements and workplace procedures                                                  |
|                                                            | 6.3 | Boiler valves and fittings are removed for maintenance according to statutory requirements and organisational SMS                                         |
|                                                            | 6.4 | Precautions for entry into confined spaces are observed                                                                                                   |

according to and organisational SMS

## Foundation Skills

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

## Range of Conditions

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:

- 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

Boiler components must include:

- ash pan and damper
- boiler controls and safety devices
- lighting and visual warning systems
- oil burning apparatus
- valves

Pre-operational safety checks must include:

- boiler water level
- checks of feed water supply and system
- combustion air supply system
- combustion equipment
- essential fittings
- firefighting equipment
- fuel supply/heat source system
- identifying and managing hazards and maintenance problems
- inspecting and locating explosion doors
- operation and position of boiler valves
- selecting PPE

Hazards and potential hazards include one or more of the following:

- boiler low water condition
- chemical hazards
- excessive noise

|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                | <ul style="list-style-type: none"><li>• hot exposed steam pipe</li><li>• lack of machinery guards</li><li>• leakage of:</li><li>• boiler<ul style="list-style-type: none"><li>• fuel</li><li>• gas</li></ul></li><li>• manual handling hazards</li><li>• obstructions and defects in work area</li><li>• poor illumination of work area</li><li>• rubbish and combustibles in area</li><li>• thermal hazards</li></ul> |
| Chemicals include one or more of the following:                | <ul style="list-style-type: none"><li>• extinguishing agent's carbon dioxide</li><li>• feed water additives</li><li>• organic foam and dry powder</li><li>• oxygen scavenger</li><li>• soda acid</li></ul>                                                                                                                                                                                                             |
| Operating log must include:                                    | <ul style="list-style-type: none"><li>• boiler status and operation</li><li>• chemical treatment</li><li>• maintenance/repair requirements</li><li>• steam pressure</li><li>• test results</li><li>• time in use</li></ul>                                                                                                                                                                                             |
| Documentation includes one or more of the following:           | <ul style="list-style-type: none"><li>• boiler certificate</li><li>• boiler operational records and user log books</li><li>• emergency procedures and instructions</li><li>• maintenance notices, records and requests</li><li>• operational instructions, policies and procedures</li></ul>                                                                                                                           |
| Maintenance requirements include one or more of the following: | <ul style="list-style-type: none"><li>• blow down valve</li><li>• boiler steam pressure gauge</li><li>• feed water stop valve</li><li>• flame failure detection device</li><li>• gauge glasses</li><li>• main steam stop valve</li><li>• safety valves</li><li>• water level controller</li></ul>                                                                                                                      |

## Unit Mapping Information

This unit replaces and is equivalent to MARC3002A Operate and maintain a boiler.

## 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 MARC023 Operate and maintain a boiler**

## **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 health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- applying precautions and required action to minimise, control or eliminate hazards that may exist when operating and monitoring boiler
- communicating effectively with others when operating and monitoring boiler performance
- completing documentation related to operating and monitoring boiler performance
- identifying and assessing boiler defects and deficiencies, and taking appropriate action to report, isolate, repair or replace identified defective equipment
- implementing contingency plans for emergencies
- initiating timely action in response to defects or damage
- providing required amount and level of detail in recordkeeping and reports
- reading and interpreting instructions, procedures, information and signs relevant to operating and monitoring boiler
- selecting and using required personal protective equipment 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:

- applicable legislation relating to steam plant and nationally approved compliance codes and/or guidelines, and codes of practice
- basic principles of boiler operation, monitoring devices, ancillary systems
- boiler controls, instruments and indicators and their purpose, location and use
- methods for:
  - adjusting controls to maximise efficient and safe running
  - carrying out minor maintenance, cleaning and servicing boiler
  - managing safety incidents and hazardous situations that may arise when operating and monitoring boiler performance
  - operating and monitoring performance of boiler ancillary equipment
- personal protective equipment (PPE) required when operating boiler and procedures for its use
- principles for starting up, operating, monitoring and shutting down boiler
- procedures to be followed:
  - when there is an emergency when operating boiler
  - for confined space entry
- relevant licensing, legislative, regulatory or certification requirements
- relevant WHS/OHS and environmental procedures and regulations
- requirements for completing relevant documentation during and after operating and monitoring boiler performance
- typical faults that can occur with boiler 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 boiler 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 to operate and maintain a boiler

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

## **Links**

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