



Australian Government

MARC3002A Operate and maintain a boiler

Release 1

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Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

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.

Application of the Unit

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

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

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|--|---|
| 1 Select and use personal protective equipment | <p>1.1 Personal protective equipment (PPE) is selected for use according to statutory requirements and workplace procedures</p> <p>1.2 Functions that require use of personal PPE are selected to enable function to be risk assessed</p> |
| 2 Carry out pre-operational safety checks | <p>2.1 Boiler components are identified and operated according to organisational operating procedures</p> <p>2.2 Boiler pre-operational safety checks are conducted according to statutory requirements and standard operating procedures</p> <p>2.3 Maintenance requirements are identified and reported according to workplace procedures</p> |
| 3 Maintain health and safety standards in work area | <p>3.1 Hazards and potential hazards in work area are identified according to statutory requirements and workplace procedures</p> <p>3.2 Hazards are reported according to statutory requirements and workplace procedures</p> <p>3.3 Prevention/control measures are selected according to organisational practice</p> <p>3.4 Boiler chemicals are stored and handled according to statutory requirements, manufacturer recommendations and workplace procedures</p> |
| 4 Operate and monitor boiler | <p>4.1 Boiler is started and brought online safely, according to statutory requirements, workplace procedures and organisational safety management systems (SMS)</p> <p>4.2 Operating status of boiler is monitored according to statutory requirements, workplace procedures and organisational SMS</p> <p>4.3 Boiler water quality tests are conducted according to workplace procedures and organisational SMS</p> <p>4.4 Boiler water is adjusted as a result of tests, to meet manufacturer recommendations and workplace criteria</p> <p>4.5 Operating log is maintained clearly and accurately, according to statutory requirements</p> |
| 5 Shut down boiler | <p>5.1 Boiler is shut down according to statutory requirements, workplace procedures and organisational SMS</p> <p>5.2 Documentation is maintained according to workplace and</p> |

organisational requirements

6 Carry out routine maintenance on boiler

- 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

Required Skills and Knowledge

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

Required Skills:

- Apply precautions and required action to minimise, control or eliminate hazards that may exist when operating and monitoring boiler
- Communicate effectively with others when operating and monitoring boiler performance
- Complete documentation related to operating and monitoring boiler performance
- Identify and assess boiler defects and deficiencies, and take appropriate action to report, isolate, repair or replace identified defective equipment
- Implement contingency plans for emergencies
- Read and interpret instructions, procedures, information and signs relevant to operating and monitoring boiler
- Select and use required personal protective equipment conform to industry and WHS/OHS standards

Required Knowledge:

- 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
- 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 work health and safety (WHS)/occupational health and safety (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

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:

- initiating timely action in response to defects or damage
- attention to appropriate level of detail in recordkeeping
- providing required amount of detail in reports
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

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:

- industry-approved marine operations site where operating and maintaining a boiler can 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 operating and maintaining a boiler
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry 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.

Personal protective equipment may include:

- 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 of a 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 may include:

- Boiler low water condition
- Chemical hazards
- Excessive noise
- Hot exposed steam pipe
- Lack of machinery guards
- Leakage of:
 - boiler
 - fuel
 - gas
- Manual handling hazards
- Obstructions and defects in work area
- Poor illumination of work area

Chemicals may include:

- Rubbish and combustibles in area
- Thermal hazards
- Extinguishing agent's carbon dioxide
- Feed water additives
- Organic foam and dry powder
- Oxygen scavenger
- Soda acid

Operating log must include:

- Boiler status and operation
- Chemical treatment
- Maintenance/repair requirements
- Steam pressure
- Test results
- Time in use

Documentation may include:

- Boiler certificate
- Boiler operational records and user log books
- Emergency procedures and instructions
- Maintenance notices, records and requests
- Operational instructions, policies and procedures

Maintenance requirements may include:

- Blow down valve
- Boiler steam pressure gauge
- Feed water stop valve
- Flame failure detection device
- Gauge glasses
- Main steam stop valve
- Safety valves
- Water level controller

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations