



Australian Government

MARL003 Demonstrate basic knowledge of marine auxiliary boilers

Release: 1

MARL003 Demonstrate basic knowledge of marine auxiliary boilers

Modification History

Release 1. new unit of competency.

Application

This unit involves the knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

Pre-requisite Unit

Not applicable.

Competency Field

L - Marine Engineering

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 Distinguish between different types of auxiliary boilers	1.1	Design and use of water tube and fire tube auxiliary boilers are compared and contrasted
	1.2	Movement of water and gas in an operating boiler is sketched
	1.3	How variations to operating pressure and saturation temperature in an auxiliary boiler can be used to get wet, dry or superheated steam is explained
2 Recognise different functions of steam	2.1	Key features of steam and other heating systems are compared and contrasted

	and different components of steam systems	2.2	Steam side requirements of an auxiliary steam turbo alternator are compared and contrasted with other steam-powered machinery
		2.3	Typical steam and condensate system is outlined
3	Explain fuel oil system of auxiliary boilers	3.1	Combustion process is explained and factors that affect combustion in a boiler are outlined
		3.2	Differentiation is made between different burner types
		3.3	Operation of a complete fuel oil system for an auxiliary boiler including the functions of components for automatic combustion control is outlined
4	Explain procedure for operating fired and unfired boilers	4.1	Locations of all mountings and fittings on auxiliary boilers are identified and their functions are outlined
		4.2	Purpose of all alarms and shut downs incorporated in auxiliary boilers is clarified
		4.3	Types and operation of safety valves are outlined
		4.4	Procedure for lighting off a boiler from cold is clarified
		4.5	Procedure for laying up for short and long periods including full blow down and shut down procedures is clarified
		4.6	Procedure for isolating an auxiliary boiler after shut down is clarified
5	Explain procedure for sampling and testing boiler water	5.1	Effects of poor water treatment practices on safety and boiler function are identified
		5.2	Correct procedure for taking boiler and feed water sample and possible errors that might occur are clarified
		5.3	Common water tests carried out are outlined and typical results are stated
		5.4	Chemicals used for treatment of boiler water are named and acceptable range of chemical reserves found in boiler waters are confirmed
6	Explain procedure for maintaining water level in the boiler	6.1	Method of testing and changing a gauge glass is outlined
		6.2	Effects of blockages in water, steam and drain cocks on levels in gauge glass are outlined
		6.3	Procedure for when a gauge glass apparently shows no water

		is clarified
7 Explain common hazards and defects and relevant prevention/ control procedures	7.1	Hazards and defects associated with auxiliary boilers are identified
	7.2	How water hammer can be prevented in auxiliary boilers is outlined
	7.3	Symptoms, causes, effects and actions to be taken in the event of oil contamination of boiler water are determined
	7.4	Difference between and measures taken to avoid fire and water side explosions are clarified
	7.5	Causes, mechanism, prevention and control of economiser fires are detailed

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.

Mountings and fittings on auxiliary boilers include one or more of the following:

- air release cock
- auxiliary steam stop valve
- blow down valve
- feed check or control valve
- main steam stop valve
- pressure gauge connection
- safety valves
- sampling connection

- scum valve
- water level gauge
- whistle stop valve

Hazards and defects include one or more of the following:

- chemical hazards
- enclosed space
- illumination of work area
- machine guarding
- manual handling
- materials
- rubbish and combustible
- steam and fuel leaks
- thermal hazards
- trips

Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5005A Demonstrate basic knowledge of marine auxiliary boilers.

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 MARL003 Demonstrate basic knowledge of marine auxiliary boilers

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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 information related to marine auxiliary boilers
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic operation of marine auxiliary boilers
- identifying and applying relevant solutions for addressing problems associated with marine auxiliary boilers
- identifying and interpreting diagnostic information and performing mathematical calculations related to operating, maintaining and repairing marine auxiliary boilers
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine auxiliary boilers.

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:

- basic principles of operation of boilers and steam systems
- combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- common boiler defects and repair procedures
- fuel oil system for an auxiliary boiler
- fittings mounted on boilers
- hazards associated with running boiler plant
- operating principles relating to steam generation in fired and unfired boilers
- principles of boiler operation in normal and emergency situations
- procedures for maintaining water level in boilers

- purpose of alarms and shut downs in marine boilers
- treatment, sampling and testing of boiler water
- types of auxiliary boilers and typical operating pressures and temperatures
- typical feed systems for marine boilers
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

Assessment Conditions

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

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

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.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

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