



Australian Government

MARL024 Demonstrate intermediate knowledge of marine auxiliary boilers

Release: 1

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Modification History

Release 1. New unit of competency.

Application

This unit involves the skills and knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel. This includes analysing the responsibilities of an Engineer Class 2 in relation to auxiliary boiler and steam plant of a vessel, the design of marine auxiliary boilers, the operation of thermal fluid heating plants, the layout of marine stem systems and components, and procedures for inspecting marine auxiliary boilers and associated plant.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

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

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 Outline responsibilities of an Engineer Class 2 in relation to auxiliary boiler and steam plant of a vessel

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| 1.1 | Commonwealth, state/territory and local legislation and regulations that relate to marine boilers and steam plant in terms of safety, repairs and pollution, including implementation, is identified |
| 1.2 | Safe operating practices for all steam plant are examined and standing orders as to their operation are prepared or modified |

	1.3	Procedure for establishing engine room staff who are fully conversant with safe practices for boiler operation is outlined
2 Evaluate design and construction of marine auxiliary boilers	2.1	Typical boiler types illustrating cross section, attachments and location of all fittings, mountings, scantlings and method of achieving circulation are examined
	2.2	Material requirements for boiler components are identified
	2.3	Construction of different types of boilers is analysed and difference recorded
3 Evaluate design and operation of thermal fluid heating plants	3.1	Different gauge glass types are compared
	3.2	Typical thermal fluid heating plant is explained and advantages and limitations of the system are identified
	3.3	Locations and functions of all fittings and safety devices in a typical thermal fluid system are explained
	3.4	Properties of thermal fluid, effects of contamination and methods of testing fluid are analysed
4 Evaluate layout and design of marine steam systems and components	4.1	Thermal fluid heating is compared to conventional steam plant
	4.2	Typical steam system layout showing location of all components on feed and heating side is detailed
	4.3	Material requirements for steam system components are identified
	4.4	Reasons for operating plant and systems at nominated temperatures and pressures, and effects of departing from these parameters are explained
5 Outline procedure for inspecting marine auxiliary boilers and associated plant	5.1	Symptoms of faults in steam traps, hot wells, de-aerators, condensers, evaporators and requirements for contamination prevention between systems, are analysed
	5.2	Procedure for shutting down, isolating and opening up a boiler for inspection or during an emergency is clarified
	5.3	Possible defects that may occur in a boiler, fire and water side, their location and effects are analysed
	5.4	Repair procedures commonly employed for damaged boilers are examined and limitations of such repairs are explained

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| | 5.5 | Procedures for leak detecting in boilers and steam equipment are clarified and remedial actions are explained |
| | 5.6 | Mechanism of economiser fires are analysed |
| 6 Differentiate between safety valves types | 6.1 | Procedure for detecting economiser fires, actions for controlling after occurrence and preventative measures are clarified |
| | 6.2 | Common types of boiler safety valves are analysed and sketched, and how they are classified in terms of valve lift is explained |
| | 6.3 | Materials used in safety valves are identified and operational problems that can occur are analysed |
| | 6.4 | Procedure for setting valve lift pressure is established and precautions necessary when testing valve on fired and non-fired boilers are examined |
| 7 Evaluate problems associated with feed and boiler water | 7.1 | Defects that may be found when dismantling a safety valve for survey are analysed |
| | 7.2 | Causes of scaling and corrosion of water side of a boiler and how these can be minimised are analysed |
| | 7.3 | Acceptable operational range and effects of contamination on boiler chemical reserves are identified |
| | 7.4 | Reliability of boiler water test results are analysed in relation to sampling procedure, testing equipment and shelving of test chemicals |
| | 7.5 | Different tests carried out on boiler water are explained and implications of out-of-range results are interpreted |
| | 7.6 | Use of different chemicals to treat and condition boiler water is assessed |
| 8 Evaluate marine fuel systems | 8.1 | Procedure to be adopted when boiler is severely contaminated from different sources is outlined |
| | 8.2 | Boiler fuel system, its components and maintenance procedure are detailed |
| | 8.3 | Combustion process, its monitoring system and requirements for good combustion are analysed |
| | 8.4 | Different types of burners are compared and contrasted and |

how atomisation is achieved is explained

- 8.5 Operation of a burner management system that incorporates pressure and level control is explained

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.

- Marine boilers and steam plant include one or more of the following:
- condensers
 - economiser
 - feed pumps
 - fired
 - high pressure
 - low pressure
 - medium pressure
 - steam – steam generators
 - unfired

Unit Mapping Information

This unit replaces and is equivalent to MARL6011A Demonstrate intermediate 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>