



Australian Government

Department of Education, Employment and Workplace Relations

TDMMR2207B OPERATE AND MAINTAIN BOILER SYSTEMS

Revision Number: 1

TDMMR2207B OPERATE AND MAINTAIN BOILER SYSTEMS

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required of an Engineer Class 3 to operate and carry out basic routine maintenance on boiler systems on a commercial vessel less than 3,000 kW propulsion power operating within offshore limits.

Application of the Unit

Application of the unit	The unit has applications in the qualification for a Marine Engine Driver Grade 3 as per relevant sections of Part D of the National Standard for Commercial Vessels (NSCV), i.e. Diploma of Transport&Distribution (Coastal Marine Engineering - Engineer Class 3).
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Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant sections of State and Territory maritime regulations and NSCV/USL Code for a Marine Engine Driver Grade 3.
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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.</i>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Operate boiler systems	- a Boiler systems are operated in accordance with established procedures and manufacturer's instructions and specifications - b Records of performance of boiler systems are maintained on running sheets and operations logs/databases in accordance with vessel's procedures
2 Carry out basic, routine checking and maintenance procedures on boiler systems	- a The performance of boiler systems is monitored in accordance with manufacturer's instructions - b Routine service checks and procedures are carried out to maintain the serviceability of boiler systems in accordance with manufacturer's instructions and vessel's procedures - c Preventative and remedial maintenance programs are carried out in accordance with manufacturer's instructions - d Poor performance and faulty operation are identified and investigated and appropriate action initiated to report or rectify the problem within the limits of responsibility - e Basic repairs are carried out on boiler systems and equipment as required - f Assistance is provided to contractors engaged to carry out repairs on boiler systems

ELEMENT	PERFORMANCE CRITERIA
2 Carry out basic, routine checking and maintenance procedures on boiler systems (continued)	g Maintenance and service records are completed in accordance with manufacturer's instructions and vessel's procedures
3 Follow safety and hazard control procedures	a Safety, hazard minimisation and pollution control procedures and regulations are followed at all times when operating boiler systems and carrying out basic maintenance b Operational and maintenance hazards are identified and action is taken to minimise or eliminate risk to personnel, vessel and the environment c Where relevant, procedures and precautions necessary for entry into confined spaces on a vessel are correctly followed d Action is taken in the event of failure or emergency to isolate and secure the boiler systems and maintain the safety of the vessel and persons involved e Vessel's emergency and contingency plans are followed in the event of a failure or emergency involving an boiler system

Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Applicable sections of relevant maritime regulations
- 2 Relevant OH&S and pollution control legislation and codes of practice
- 3 Statutory requirements for the operation and maintenance of medium to low pressure steam plants and boiler systems
- 4 Types of medium to low pressure boiler systems used on vessels up to 3,000 kW propulsion power, including their principal features and operating characteristics
- 5 Basic construction of medium to low pressure boilers, including fittings that accord with safety and statutory requirements
- 6 The basic principles of operation and safety of boilers, steam and feed systems, steam engines and turbines, including the care and management of boilers and their fittings and basic feed water systems, testing and treatment
- 7 Procedures for the operation and routine maintenance of medium to low pressure boiler systems on vessels up to 3,000 kW propulsion power within limits of responsibility of an Engineer Class 3
- 8 Basic properties of steam
- 9 Procedures for the use gauges and meters to monitor and measure performance
- 10 The causes, effects of, and methods of detection of boiler water contamination
- 11 Hazard control precautions and procedures relevant to the operation and routine maintenance of steam plants and boiler systems
- 12 Typical problems related to the operation and maintenance of boiler systems on vessels up to 3,000 kW propulsion power within limits of responsibility of an Engineer Class 3 and appropriate diagnostic action and related solutions
- 13 Mathematical techniques to solve basic engineering and maintenance problems
- 14 Precautions that must be taken when working on boiler systems and associated equipment to minimise danger of fire or explosion.
- 15 Maintenance records that must be maintained on a vessel to meet the requirements of the company and regulatory authorities

REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Use communication skills required when operating and maintaining boiler systems on a vessel within limits of responsibility of an Engineer Class 3
- 2 Read and interpret maintenance and service manuals and instructions and equipment specifications and drawings for boiler systems and associated equipment, including all required OH&S procedures and precautions
- 3 Read, interpret and follow standard operating and emergency procedures when operating and maintaining boiler systems on a vessel of less than 3,000 kW propulsion power within limits of responsibility of an Engineer Class 3
- 4 Read and interpret material safety data sheets
- 5 Read and interpret performance readings and indications on boiler systems and associated equipment
- 6 Complete any required operational and maintenance records
- 7 Provide leadership to other crew members when operating and maintaining boiler systems
- 8 Work safely and collaboratively with others when operating and maintaining boiler systems
- 9 Plan and organise routine maintenance activities on boiler systems on a small vessel
- 10 Monitor the selection and use of relevant tools and equipment as per instructions
- 11 Recognise faulty equipment and take appropriate action as per operating instructions
- 12 Recognise routine problems when operating and maintaining boiler systems on a small vessel and take appropriate action
- 13 Adapt to differences in vessels, boiler systems and equipment, and standard operating procedures
- 14 Monitor that all safety precautions and procedures are followed when operating and maintaining boiler systems on a small vessel

Evidence Guide

Evidence Guide

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

1 Critical aspects of evidence required to demonstrate competency in this unit	Assessment must confirm appropriate knowledge and skills to: - a Operate boiler systems and associated equipment on a vessel less than 3,000 kW propulsion power within limits of responsibility of an Engineer Class 3 - b Carry out preventative and remedial maintenance on boiler systems on a vessel within limits of responsibility of an Engineer Class 3 - c Identify typical problems related to the operation and maintenance of boiler systems on a vessel and take appropriate action within limits of responsibility of an Engineer Class 3 - d Exercise all required safety, environmental and hazard control precautions and procedures during operation and routine maintenance of systems - e Communicate effectively with others when operating and carrying out maintenance on boiler systems on a vessel
2 Evidence required for demonstration of consistent performance	- a Performance is demonstrated consistently over a period of time and in a suitable range of contexts - b Consistently applies underpinning knowledge and skills when: 1 operating boiler systems on vessels up to 3,000 kW propulsion power operating within inshore limits 2 carrying out preventative and remedial maintenance on boiler systems on a vessel 3 identifying and evaluating typical operational and maintenance problems and determining appropriate

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- courses of action
- 4 applying safety and pollution control precautions when operating boiler systems on a vessel
- 5 identifying and implementing improvements to operational and routine maintenance procedures
- c Shows evidence of application of relevant workplace procedures, including:
 - 1 relevant sections of Australian USL Code
 - 2 OH&S regulations and hazard prevention policies and procedures
 - 3 job procedures and work instructions
 - 4 relevant vessel manufacturer's guidelines relating to operating and carrying out routine maintenance on boiler systems on a vessel

Evidence Guide (continued)**TDMMR2207B OPERATE AND MAINTAIN BOILER SYSTEMS**

2 Evidence required for demonstration of consistent performance (continued)

- 5 environmental protection procedures when carrying out maintenance operations
- d Action is taken promptly to report and/or rectify issues and problems identified with operating and maintaining boiler systems in accordance with manufacturer's instructions, statutory requirements and company procedures
- e Work is completed systematically with required attention to detail
- f Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among crew and others

Evidence Guide (continued)**TDMMR2207B OPERATE AND MAINTAIN BOILER SYSTEMS****3 Context of assessment**

- a Assessment of competency must comply with the assessment requirements of the relevant maritime regulations
- b Assessment of this unit must be undertaken within relevant marine authority approved and audited arrangements by a registered training organisation:
 - 1 As a minimum, assessment of knowledge must be conducted through appropriate written/oral examinations, and
 - 2 Appropriate practical assessment must occur:
 - i at the registered training organisation; and/or
 - ii on an appropriate working or training vessel

4 Specific resources required for assessment

- Access is required to opportunities to:
- a participate in a range of exercises, case studies and other simulated practical and knowledge assessments that demonstrate the skills and knowledge to operate and maintain boiler systems on vessels up to 3,000 kW propulsion power; and/or
 - b operate and maintain boiler systems on an operational commercial or training vessel up to 3,000 kW propulsion power operating within offshore limits

Range Statement

Range Statement

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

VARIABLE

SCOPE

1. GENERAL CONTEXT

a. Work must be carried out:	1 in compliance with the relevant maritime regulations
b. Work is performed:	1 within broad operational requirements, with responsibility for own outputs in relation to specified quality standards and limited responsibility for others in achieving the specified quality and quantity of outcomes
c. Work involves:	1 the operation and maintenance of boiler systems on a vessel and the application of solutions to a defined range of maintenance problems falling within limits of responsibility of an Engineer Class 3

2. WORKSITE ENVIRONMENT

a Vessel may include:	1 any commercial vessel less than 3,000 kW propulsion power operating within offshore limits
b Operation and maintenance of boiler systems may be conducted:	1 by day or night in both normal and emergency situations 2 under any permissible conditions of weather 3 while underway 4 during berthing and unberthing operations

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	5 while berthed, anchored or moored
	6 in dry dock
	7 when bunkering
	8 during cargo operations
c Maintenance may include:	1 preventative and remedial maintenance and basic repairs of boiler systems and related equipment and components 2 routine servicing in accordance with established procedures 3 routine visual checks 4 identification of poor performance or faults in the operation of boiler systems

Range Statement (continued)**TDMMR2207B OPERATE AND MAINTAIN BOILER SYSTEMS**

VARIABLE	SCOPE
c Maintenance may include: (continued)	5 identification of faulty equipment or fittings and arranging for repair or replacement 6 assisting contractors in repair operations
d Maintenance tools and equipment may include:	1 hand tools, including screwdrivers, spanners, wrenches 2 lifting gear and equipment 3 protective clothing and equipment such as: 4 eye and ear protection

Range Statement (continued)**TDMMR2207B OPERATE AND MAINTAIN BOILER SYSTEMS**

	5	safety boots and helmet
	6	dust and fume masks
e Documentation and records may include:	1	safety management system plans, procedures, checklists and instructions
	2	State and Territory marine regulations related to the operation of small vessels, NSCV and USL Code
	3	company and vessel operational and maintenance procedures
	4	preventative and remedial maintenance schedules and records
	5	equipment manufacturer's instructions, specifications and recommended procedures
	6	instructions of relevant maritime authorities related to the maintenance of vessels
	7	relevant Australian standards
f Applicable legislation, regulations and codes may include:	1	State and Territory marine regulations related to the operation of small vessels
	2	National Standard for Commercial Vessels and USL Code
	3	relevant international, Commonwealth, State and Territory OH&S and pollution control legislation
	4	relevant international and Australian engineering standards

Unit Sector(s)

Not applicable.

Field

Field R Carry Out Operations on Equipment and Systems

Relationship to other units

Relationship to other units	The unit may be assessed in conjunction with other units that relate to the functions of the occupation(s) concerned.
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