



Australian Government

Department of Education, Employment and Workplace Relations

TDMMR2407B OPERATE AND MAINTAIN INTERNAL COMBUSTION ENGINES AND PROPULSION TRANSMISSION SYSTEMS

Release: 1

TDMMR2407B OPERATE AND MAINTAIN INTERNAL COMBUSTION ENGINES AND PROPULSION TRANSMISSION SYSTEMS

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required to operate and carry out basic routine maintenance on internal combustion engines and propulsion systems on a small commercial vessel of up to 1,500 kW propulsion power.

Application of the Unit

Application of the unit	The unit has applications in the qualification for a Marine Engine Driver Grade 1 (MED 1) as per relevant sections of Part D of the National Standard for Commercial Vessels (NSCV), i.e. Certificate IV in Transport&Distribution (Marine Engine Driving - Grade 1).
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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 MED 1.
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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 internal combustion engines and propulsion systems	. a Internal combustion engines and propulsion transmission systems are prepared, started, and shut down as per manufacturer's instructions and established marine practice b Internal combustion engines and propulsion systems are operated within specified limits as per established procedures and manufacturer's instructions and specifications c Records of performance of internal combustion engines and propulsion 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 internal combustion engines and propulsion systems	a The performance of internal combustion engines and propulsion systems is monitored as per survey requirements and manufacturer's instructions, and performance is compared with specifications and recommended limits of performance b Preventative and remedial maintenance programs are carried out as per company and vessel's procedures, vessel's survey requirements and manufacturer's instructions c Poor performance and faulty operation are identified and appropriate action initiated to report or rectify the problem within the limits of responsibility and skill in accordance with company procedures

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ELEMENT	PERFORMANCE CRITERIA
2 Carry out basic, routine checking and maintenance procedures on internal combustion engines and propulsion systems (continued)	- d Routine service checks and procedures are followed to maintain the serviceability of internal combustion engines and propulsion systems in accordance with manufacturer's instructions - e Maintenance and service records are completed in accordance with manufacturer's instructions and vessel's procedures - a The performance of internal combustion engines and propulsion systems is monitored as per survey requirements and manufacturer's instructions and performance is compared with specifications and recommended limits of performance - b Preventative and remedial maintenance programs are carried out in accordance with company and vessel's procedures, vessel's survey requirements and manufacturer's instructions - c Poor performance and faulty operation are identified and appropriate action initiated to report or rectify the problem within the limits of responsibility and skill in accordance with company procedures - d Routine service checks and procedures are followed to maintain the serviceability of internal combustion engines and propulsion systems in accordance with manufacturer's instructions - e 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 national and international regulations are followed at all times - b Operational and maintenance hazards are identified and action is taken to minimise or eliminate risk to personnel, vessel and the environment

ELEMENT	PERFORMANCE CRITERIA
	- 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 internal combustion engines and propulsion 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 internal combustion engines or the propulsion system

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Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Relevant OH&S and pollution control legislation and codes of practice
- 2 Types of engines and propulsion systems used on small vessels up to 1,500 kW propulsion power, including their principal features and operating characteristics
- 3 Procedures for the operation, servicing and routine maintenance of internal combustion engines and propulsion systems on a small vessel
- 4 Safety, environmental and hazard control precautions and procedures relevant to the operation and routine maintenance of internal combustion engines and propulsion systems
- 5 Problems related to the operation and maintenance of internal combustion engines and propulsion systems on small vessels and appropriate action and solutions within limits of responsibility of a Marine Engine Driver Grade 1
- 6 Maritime communication techniques needed during the operation and maintenance of internal combustion engines and propulsion systems on small vessels
- 7 Types of maintenance records that must be maintained on a vessel to meet the requirements of the company and regulatory authorities

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REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Use verbal communication skills required when operating and maintaining internal combustion engines and propulsion transmission systems

REQUIRED SKILLS

- 2 Read, interpret and apply operating and service manuals and instructions for internal combustion engines and propulsion transmission systems
- 3 Read and interpret material safety data sheets
- 4 Read and interpret machinery performance readings and indications
- 5 Complete any required operational and maintenance records
- 6 Work safely and collaboratively with others when operating and maintaining internal combustion engines and propulsion transmission systems
- 7 Select and use relevant tools and equipment as per instructions
- 8 Recognise faulty equipment and take appropriate action as per operating instructions
- 9 Recognise routine problems when operating and maintaining internal combustion engines and propulsion transmission systems and take appropriate action
- 10 Adapt to differences in vessels, auxiliary systems and operating and servicing procedures
- 11 Operate internal combustion engines and propulsion transmission systems on vessels of less than 1,500 kW propulsion power

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.

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| 1 Critical aspects of evidence required to demonstrate | Assessment must confirm appropriate knowledge and skills to: <ol style="list-style-type: none">a Operate internal combustion engines and propulsion systems on a small vessel |
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this unit	- b Carry out preventative servicing and remedial maintenance on internal combustion engines and propulsion systems on a small vessel within limits of responsibility of a Marine Engine Driver Grade 1 - c Identify typical problems related to the operation, servicing and maintenance of internal combustion engines and propulsion systems on a small vessel and take appropriate action - d Exercise all required safety, environmental and hazard control precautions and procedures during operation and routine maintenance of maintenance of internal combustion engines and propulsion systems - e Communicate effectively with others when operating and carrying out maintenance on internal combustion engines and propulsion systems on a small 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 internal combustion engines and propulsion systems on a small vessel up to 1,500 kW propulsion power 2 carrying out preventative servicing and remedial maintenance on internal combustion engines and propulsion systems on a small vessel 3 identifying and evaluating typical operational, servicing and maintenance problems and determining appropriate courses of action 4 applying safety and pollution control precautions when operating internal combustion engines and propulsion systems on a small vessel - c Shows evidence of application of relevant workplace procedures, including: 1 relevant sections of State and Territory marine regulations, NSCV/USL Code 2 OH&S regulations and hazard prevention policies and

	procedures
3	standard operating procedures and work instructions
4	relevant vessel manufacturer's guidelines relating to operating and carrying out routine maintenance on internal combustion engines and propulsion systems on a small vessel

Evidence Guide (continued)

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2 Evidence required for demonstration of consistent performance (continued)	5 environmental protection procedures during maintenance operations d Action is taken promptly to report and/or rectify problems identified with operating and maintaining internal combustion engines and propulsion systems in accordance with manufacturer's instructions 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
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 internal combustion engines and propulsion systems on small vessels up to 1,500 kW propulsion power and/or - b operate and maintain internal combustion engines and propulsion systems on an operational small commercial of less than 1,500 kW propulsion power
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Range Statement

Range Statement

TDMMR2407B OPERATE AND MAINTAIN INTERNAL COMBUSTION ENGINES AND PROPULSION TRANSMISSION SYSTEMS

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
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1. GENERAL CONTEXT

a. Work must be carried out:	1 in compliance with the relevant sections of State and Territory marine regulations, NSCV and USL Code
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

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

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| c. Work involves: | 1 the organisation of maintenance operations on a vessel and the application of solutions to a defined range of maintenance problems |
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2. WORKSITE ENVIRONMENT

a Vessel may include:	1 any small commercial vessel up to 1,500 kW propulsion power
b Operation and maintenance of internal combustion engines and propulsion 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 5 while berthed, anchored or moored 6 while in dry dock 7 when bunkering 8 during cargo operations

Range Statement (continued)

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VARIABLE	SCOPE
c Internal combustion engines and propulsion systems may include:	1 low speed, medium and high speed diesel propulsion 2 stern tube bearing 3 CPP 4 direct drive shaft

VARIABLE	SCOPE
	5 diesel electric 6 reduction gears 7 thrust blocks, detuners and shaft bearings
d Maintenance may include:	1 preventative and remedial maintenance and basic repairs of internal combustion engines and propulsion systems and related equipment and components 2 lubrication of internal combustion engines and propulsion systems 3 routine servicing in accordance with established procedures 4 routine visual and performance checks 5 identification of poor performance or faults in the operation of internal combustion engines and propulsion systems 6 identification of faulty equipment or fittings and arranging for repair or replacement 7 assisting contractors in repair operations
e Maintenance tools and equipment may include:	1 hand tools, including screwdrivers, spanners, wrenches 2 greasing and lubrication tools 3 lifting gear and equipment 4 protective clothing and equipment such as: - i eye and ear protection - ii safety boots and helmet - iii dust and fume masks
f Maintenance and repair hazards may	1 moving heavy loads using unsafe lifting procedures 2 unsecured machinery, components or repair equipment

VARIABLE	SCOPE
include:	3 slippery deck 4 power tools 5 moving and rotating machinery 6 flammable liquids, vapours and fuel

Range Statement (continued)

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VARIABLE	SCOPE
f Maintenance and repair hazards may include: (continued)	7 faulty machinery equipment handling equipment and lifting gear 8 using equipment beyond safe working limits 9 poor housekeeping procedures 10 non-compliance with safe working procedures
g Documentation and records may include:	1 vessel's planned maintenance system, repair procedures and instructions 2 manufacturer's specifications, instructions and recommended procedures 3 maintenance records 4 vessel's safety and emergency contingency plans and procedures 5 relevant material safety data sheets 6 relevant sections of the State and Territory marine regulations, the National Standard for Commercial Vessels and USL Code

VARIABLE	SCOPE
h 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 Commonwealth, State and Territory OH&S and pollution control legislation 4 relevant 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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