



Australian Government

Department of Education, Employment and Workplace Relations

TDMMF4007B CARRY OUT BASIC OPERATIONAL ENGINEERING CALCULATIONS

Revision Number: 1

TDMMF4007B CARRY OUT BASIC OPERATIONAL ENGINEERING CALCULATIONS

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required to carry out basic operational engineering calculations when operating a small commercial vessel, including conversion of volumes to litres and calculations of volume, specific gravity, bunkering capacity, specific fuel consumption, speed and range of vessel.

Application of the Unit

Application of the unit	The unit has applications in the qualification for a Marine Engine Driver Grade 2 (MED 2) as per relevant sections of Part D of the National Standard for Commercial Vessels (NSCV), i.e. Certificate II in Transport&Distribution (Maritime Operations) and Certificate III in Transport&Distribution (Marine Engine Driving - Grade 2).
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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 2.
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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 Carry out basic engineering calculations	- a Information required for basic operational engineering calculations is obtained from readings on instrumentation and gauges or other relevant sources in accordance with procedures - b Basic calculations for small vessel operations are carried out to accepted working tolerances - c The results of basic engineering calculations are verified in accordance with established procedures - d The results of calculations are applied to engineering operations as required - e The results of operations and maintenance calculations are reported and recorded in accordance with procedures

Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Relevant sections of State and Territory maritime regulations, NSCV and USL Code dealing with the maintenance of small vessels
- 2 Methods for working out the basic engineering calculations required when operating a small vessel, including acceptable working tolerances
- 3 Communication techniques required when completing and reporting on basic engineering calculations on board a small vessel

REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Read, interpret and apply simple instructions for measurements and related calculations within the limits of responsibility of a MED 2
- 2 Read and interpret machinery performance readings and indications
- 3 Carry out the basic operational engineering calculations within the limits of responsibility of a MED 2
- 4 Complete any required records of calculations and results
- 5 Work collaboratively with others when taking measurements and carrying out related calculations within the limits of responsibility of a MED 2
- 6 Adapt to differences in vessels, equipment and operating and servicing procedures as they relate to required engineering calculations
- 7 Follow required work schedule as per company requirements

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 Carry out basic engineering calculations - b Record and report the outcomes of basic engineering calculations - c Communicate effectively with others when completing and reporting on basic engineering calculations
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 carrying out and reporting on basic engineering calculations, 2 maintaining required records of engineering calculations - c Shows evidence of application of relevant workplace procedures, including: 1 relevant sections of State and Territory marine regulations, NSCV and USL Code 2 procedures for working out engineering calculations using established methods 3 job procedures and work instructions - d Action is taken promptly to report any operational and maintenance problems identified through engineering calculations

Evidence Guide

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	- 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:

Evidence Guide (continued)

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3 Context of assessment (continued)	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 and assessments that demonstrate the skills and knowledge to carry out and report on basic engineering calculations on a small vessel; and/or - b carry out and report on basic calculations while in charge of a small commercial or training vessel

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 sections of State and Territory marine regulations, NSCV and USL Code
b. Work is performed:	1 within defined operational procedures, with responsibility for own outputs in relation to the completion of required basic engineering calculations and the reporting and application of the outcomes of the calculations to the operation of a small vessel
d. Work requires:	1 responsibility for the accuracy of the calculations and the appropriateness of their application to vessel operations

2. WORKSITE ENVIRONMENT

a Vessel may include:	1 any small commercial vessel
b Completion of calculations and the completion of running and maintenance logs of a vessel	1 by day or night in both normal and emergency situations 2 under any permissible conditions of weather 3 while underway 4 while anchored or moored

Range Statement

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may be required:

- 5 during maintenance operations
- 6 when vessel is slipped
- 7 when bunkering
- 8 during cargo operations

Range Statement (continued)

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VARIABLE	SCOPE
c Calculations may include:	1 specific fuel consumption of vessel 2 speed of vessel 3 range of vessel 4 volumes 5 conversion of volume to litres 6 specific gravity
d Calculations may be carried out:	1 manually 2 with the aid of tables and charts 3 with the aid of a calculator 4 with the aid of a computer

Range Statement (continued)

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e Documentation and records may include:	1 relevant sections of State and Territory marine regulations, NSCV and USL Code 2 running and maintenance logs 3 vessel and equipment manufacturer's instructions
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 Commonwealth, State and Territory OH&S and pollution control legislation 4 relevant Australian standards

Unit Sector(s)

Not applicable.

Field

Field MF Operational Quality and Safety

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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