



Australian Government

AURRTE012 Analyse and evaluate faults in light marine engine and powerhead systems

Release: 1

AURRTE012 Analyse and evaluate faults in light marine engine and powerhead systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to analyse and evaluate faults in light marine engine and power head systems in order to initiate action to sustain, vary or enhance performance. It involves identifying, evaluating, selecting, justifying and documenting the most appropriate rectification method or variation to the rectification method. The unit includes the analysis of multi-system and intermittent faults which may be caused by operating in adverse conditions.

It applies to those working in the marine service and repair industry on inboard or outboard marine vessels.

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

Competency Field

Marine

Unit Sector

Technical - Engines

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Identify and confirm the work requirement	1.1 Objective of the analysis and evaluation is determined from workplace instructions

Elements Elements describe the essential outcomes.	Performance Criteria Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
	1.2 Specifications for light marine engine and powerhead system are sourced and interpreted 1.3 System faults, deficiencies or discrepancies are identified and confirmed 1.4 Hazards associated with the work are identified and risks are managed according to workplace procedures and safety and environmental requirements
2. Prepare for analysis and evaluation	2.1 Evaluation criteria are developed or adopted to meet the objective of the analysis and evaluation 2.2 Analytical and evaluative methodology is developed or identified from technical information 2.3 Testing equipment is prepared according to manufacturer specifications and workplace procedures 2.4 Tools and materials required to support the diagnostic procedure are identified, selected and prepared for use 2.5 Engine and power head system and components are prepared for the diagnostic process
3. Carry out failure analysis	3.1 Selected analytical and evaluative methodology is followed according to manufacturer specifications and workplace procedures 3.2 Tests are carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.3 Analytical and other diagnostic findings are verified, as required, by using reliable alternative or optional processes 3.4 Analytical findings and results are assessed against evaluation criteria 3.5 Valid conclusions are drawn from available evidence and documented according to workplace requirements
4. Make recommendations	4.1 Options for responding to the objective are determined from further research of technical support information 4.2 Rectification method is selected from an analysis of the options, operating conditions, regulatory requirements, Australian Design Rules, and financial implications 4.3 Report is prepared specifying analysis and evaluation process, and detailing and justifying rectification method or variation to the rectification method
5. Complete work	5.1 Final inspection is made to ensure work is to workplace

Elements Elements describe the essential outcomes.	Performance Criteria Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
processes	expectations 5.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 5.3 Tools and equipment are checked and stored according to workplace procedures 5.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are not explicit in the performance criteria.

Skills	Description
Learning skills to:	• apply learning and processes to different situations.
Reading skills to:	• research, organise and interpret technical information relating to light marine engine and power head systems.
Writing skills to:	• legibly and accurately fill out workplace documentation when reporting failure analysis findings • document and complete reports.
Numeracy skills to:	• use mathematical ideas and techniques to complete measurements, calculate analytical requirements, calibrate testing equipment and present analytical results.
Planning and organising skills to:	• plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	• use specialised light marine engine and power head diagnostic equipment.

Range of Conditions

This section specifies 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. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Safety and environmental requirements</i> must include:	• work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: • lifting and supporting engines • running engines, including working with: • exhaust fumes • rotating shafts • environmental requirements, including procedures for trapping, storing and disposing of fluids released from engine and power head systems.
<i>Analytical and evaluative methodology</i> must include:	• diagnostic process, sequence, tests and testing equipment.

Unit Mapping Information

Equivalent to AURRTE5012 Analyse and evaluate light marine engine and powerhead system faults

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURRTE012 Analyse and evaluate faults in light marine engine and powerhead systems

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Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standards defined in this unit's elements, performance criteria, range of conditions and foundation skills:

- analyse and evaluate a fault in the engine and power head systems of three different light marine vessels, including:
 - a fault in one inboard engine system
 - a fault in one outboard engine system.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to analysing and evaluating faults in light marine engine and power head systems, including procedures for:
 - lifting and supporting engines
 - running engines, including working with:
 - exhaust fumes
 - rotating shafts
- environmental requirements, including procedures for trapping, storing and disposing of fluids released from engine and power head systems
- principles and processes involved in planning and implementing analysis and evaluation of engine and power head systems
- design and planning of diagnostic procedures of light marine engine and powerhead systems
- design, manufacture, operation and limitations of light marine engine and power head systems and components, including:
 - two-stroke and four-stroke petrol engines

- diesel engines
- vessel systems and their impact on engine operation, including:
 - ignition systems
 - intake and exhaust systems
 - lubrication systems
 - cooling systems
 - engine mounting systems
- testing procedures for light marine engine and powerhead systems, including:
 - non-destructive testing (NDT)
 - engine performance and maximum speed
 - full load water testing
- types, functions, operation and limitations of diagnostic testing equipment required to analyse and evaluate faults in light marine engine and power head systems
- procedures for documenting and reporting the analysis and evaluation process
- requirements of Australian Design Rules (ADRs) relating to light marine engine and power head systems.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the light marine engine and power head systems that they have worked on, e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- marine repair workplace or simulated workplace
- workplace instructions
- manufacturer engine and power head system specifications
- three different light marine vessels with faults in the light marine engine and power head systems specified in the performance evidence
- diagnostic equipment for light marine engine and power head systems
- tools, equipment and materials appropriate for analysing and evaluating light marine engine and power head systems.

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