



Australian Government

AURPTE003 Diagnose and repair outdoor power equipment engines

Release: 1

AURPTE003 Diagnose and repair outdoor power equipment engines

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to diagnose and repair faults in the spark ignition and compression ignition engines of outdoor power equipment. It involves preparing for the task, selecting the correct diagnostic procedure, carrying out the diagnosis and the repair, performing post-repair testing, and completing workplace processes and documentation.

It applies to those working in the automotive service and repair industry. The engines include those in outdoor power equipment. This unit does not apply to light or heavy vehicles.

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

Competency Field

Outdoor Power Equipment

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. Prepare to diagnose and repair outdoor power equipment engine	1.1 Job requirements are determined from workplace instructions 1.2 Diagnostic information is sourced and interpreted 1.3 Diagnostic options are analysed and those most appropriate to the

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.
	circumstances are selected 1.4 Hazards associated with the work are identified and risks are managed 1.5 Diagnostic tools and equipment are selected and checked for serviceability
2. Diagnose engine	2.1 Diagnostic tests are carried out according to manufacturer specifications, workplace procedures, and environmental and safety requirements 2.2 Faults are identified from diagnostic test results and causes of faults are determined 2.3 Diagnosis findings, including recommendations for necessary repairs or adjustments, are reported according to workplace procedures 2.4 Obtain authorisation to proceed according to workplace procedures
3. Repair engine	3.1 Repair information is sourced and interpreted 3.2 Repair options are analysed and those most appropriate to the circumstances are selected 3.3 Repair tools, equipment and materials are selected and prepared 3.4 Repairs and component replacements and adjustments are carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements, and without causing damage to components or systems 3.5 Post-repair testing is carried out according to workplace procedures to confirm fault rectification, and any further problems detected as having been introduced during the repair process are rectified
4. Complete work processes	4.1 Final inspection is made to ensure work is to workplace expectations and engine is presented ready for use, including protective guards, cowlings and safety features 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 4.3 Tools and equipment are checked and stored according to workplace procedures 4.4 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:	locate appropriate sources of information efficiently.
Reading skills to:	interpret information from manufacturer and workshop literature when seeking outdoor power equipment engine specifications and procedures.
Writing skills to:	legibly and accurately fill out workplace documentation when reporting diagnostic findings, making repair recommendations, and recording parts and material used.
Oral communication skills to:	- clarify instructions - report diagnostic findings and make repair recommendations.
Numeracy skills to:	- measure engine components and use basic mathematical operations, including addition and subtraction, to calculate distances, tolerances and deviations from manufacturer specifications - operate specialised measurement and calibration equipment.
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 engine test and diagnosis equipment - use precision measuring equipment, such as micrometers, bore gauges and tachometers.

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 requirements</i> must include:	work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for working with rotating and hot components.
<i>Repair information</i> must include procedures for:	- dismantling and reassembling engines - repairing and replacing faulty or worn engine components - testing and adjusting engine components.
<i>Environmental</i>	procedures for trapping, storing and disposing of lubricants and fluids released from outdoor power equipment engines.

requirements must include:	
Post-repair testing must include:	• starting and running up engine to operating temperature and checking against manufacturer specifications, workplace procedures, and safety and environmental requirements • making final adjustments and re-testing as required.

Unit Mapping Information

Equivalent to AURPTE3003 Repair engines and engine components (outdoor power equipment)

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 AURPTE003 Diagnose and repair outdoor power equipment engines

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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:

- diagnose and repair a fault in two different outdoor power equipment engines, including in two of the following engine types:
 - two-stroke spark ignition engine
 - four-stroke spark ignition engine
 - four-stroke compression ignition engine
- in working on the above engines, removing, refitting or replacing the:
 - cylinder head
 - camshaft
 - piston and connecting rod
 - crankshaft.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to diagnosing and repairing outdoor power equipment engines, including procedures for working with rotating and hot components
- environmental requirements, including procedures for trapping, storing and disposing of lubricants and fluids released from outdoor power equipment engines
- operating principles of the outdoor power equipment engines and associated components, including:
 - two and four-stroke spark ignition engines and four-stroke compression ignition engines, including:

- combustion cycle
- swept volume and engine volume
- compression ratio
- valve timing
- engine efficiency, including volumetric efficiency, thermal efficiency and mechanical efficiency
- torque and horsepower, including brake horsepower
- engine measurement and performance, including:
 - swept volume and engine volume
 - compression ratio
 - valve timing
 - engine efficiency, including volumetric efficiency, thermal efficiency and mechanical efficiency
- types of lubricants, and associated application and methods of lubrication
- application, purpose and operation of outdoor power equipment engines and components, including:
 - lubrication system, cylinder blocks, cylinders, pistons, cylinder heads, combustion chambers, inlet and exhaust manifolds, connecting rods, crankshafts, pistons, piston rings, gudgeon pins, camshafts, timing gears, vibration dampers and flywheels
- diagnostic testing procedures for outdoor power equipment engines, including:
 - engine compression tests
 - vacuum tests
 - checking for sources of fluid leak
 - checking abnormal engine noises
- dismantling procedures for outdoor power equipment engines, including procedures for :
 - measuring clearances and tolerances
 - inspecting components
- repair procedures for outdoor power equipment engines, including procedures for removing and replacing the:
 - cylinder head
 - piston and connecting rod
 - crankshaft
 - camshaft
- assembly procedures for outdoor power equipment engines, including adjusting components
- post-repair testing procedures for outdoor power equipment engines, including idle and governor adjustments.

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 outdoor power equipment engines 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:

- automotive repair workplace or simulated workplace
- workplace instructions
- manufacturer outdoor power equipment engine specifications
- different types of outdoor power equipment engines specified in the performance evidence
- diagnostic equipment for outdoor power equipment engines
- tools, equipment and materials appropriate for diagnosing and repairing outdoor power equipment engines.

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