



Australian Government

AURTTE008 Dismantle and assemble multi-cylinder four-stroke petrol engines

Release: 1

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Modification History

Release	Comment
Release 1	New unit of competency

Application

This unit describes the performance outcomes required to dismantle and reassemble a multi-cylinder four-stroke engine. It requires the learner to plan and prepare the task; dismantle the engine and inspect the components; reassemble the engine and check the engine operation; and maintain the work area, tools and equipment.

It applies to those undertaking a Vocational Education and Training in Schools (VETiS) or pre-vocational qualification as preparation to entering the automotive service and repair or automotive manufacturing industry.

The unit is designed for use in a highly supervised context and is not suitable for use in a vocational qualification.

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

Competency Field

Mechanical Miscellaneous

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 italicised text is used, further information is detailed in the range of conditions section
1. Prepare to dismantle and re-assemble a multi-cylinder	1.1 <i>Safety and environmental requirements</i> are sourced and interpreted 1.2 Task instruction is interpreted and engine to be worked on is

ELEMENTS	PERFORMANCE CRITERIA
four-stroke petrol engine	identified 1.3 Manufacturer specifications and workplace procedures for engine dismantle and assembly are sourced and interpreted 1.4 Potential hazards and risks associated with task are identified and reported to workplace supervisor 1.5 Tools and equipment required for dismantling and assembling multi-cylinder four-stroke petrol engine are identified according to manufacturer specifications
2. Dismantle engine and clean its components	2.1 Tools, equipment and materials are selected and checked prior to use according to manufacturer specifications and safety requirements 2.2 Engine is cleaned according to manufacturer specifications and workplace procedures 2.3 Engine is dismantled without causing damage to components, tools or equipment 2.4 Engine components are cleaned and arranged for identification according to workplace procedures
3. Identify, inspect and measure engine components	3.1 Measuring equipment and tools are selected and checked according to manufacturer specifications and workplace safety procedures 3.2 Engine and components are measured and results compared against manufacturer specifications 3.3 Engine bearing information is sourced and interpreted, and engine bearing type and associated loads are identified 3.4 Information on engine seals, sealants and gaskets is sourced and interpreted, and engine seals, sealants and gaskets are identified 3.5 Engine component inspection results are recorded
4. Inspect engine cooling system and components and identify type	4.1 Information on the function, type and components of cooling system is sourced and interpreted 4.2 Cooling system components are identified and inspected according to manufacturer specifications 4.3 Cooling system component inspection results are recorded
5. Re-assemble engine and perform operational tests	5.1 Information on engine seals, sealants and gaskets is sourced and interpreted 5.2 Engine components are prepared for assembly according to manufacturer specifications and safety and environmental requirements 5.3 Engine is re-assembled according to manufacturer specifications, and without causing damage to components, tools and equipment 5.4 Engine is tested for correct assembly and operation 5.5 Engine re-assembly and testing procedures are recorded

ELEMENTS	PERFORMANCE CRITERIA
6. Complete work processes	6.1 Final inspection is made to ensure work meets task instruction and workplace standards, and engine is presented ready for use or storage according to workplace procedures 6.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected and stored according to environmental requirements and workplace procedures 6.3 Tools and equipment are checked and stored in a condition ready for use according to workplace procedures, or tagged and reported where necessary 6.4 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 vehicle engine information and engine dismantle and reassembly procedures.
Reading skills to:	- select and interpret key information from manufacturer specifications, safety requirements and workplace procedures to safely dismantle and assemble a multi-cylinder four-stroke engine - select and interpret key information from environmental requirements and workplace procedures to ensure a clean and safe work site.
Writing skills to:	legibly and accurately fill out workplace documentation using correct industry terminology and conventions.
Oral communication skills to:	participate effectively in verbal exchanges using questioning and active listening to request, clarify and clearly convey information.
Numeracy skills to:	- read and interpret numerical information in engine information - use specialist tools and measuring equipment correctly, including verniers, micrometers and torque wrenches, and report and record the results correctly using relevant mathematical symbols and conventions (e.g. mm for millimeters) - use basic mathematical operations, including addition, subtraction, multiplication and division, to calculate clearances and ratios.

Skills	Description
Planning and organising skills to:	plan own work requirements and prioritise actions to achieve required outcomes.
Self-management skills to:	recognise own limitations when selecting and using tools and equipment and seek timely advice.
Problem-solving skills to:	- identify potential or actual hazards and take action to minimise risk - refer problems that cannot be readily resolved and seek assistance from workplace supervisor.

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:	- information about key aspects of work health and safety (WHS), occupational health and safety (OHS) and environmental requirements, including: - use of safety glasses, ear protection and safety footwear - use of engine dismantling and re-assembly equipment - collection and disposal of used engine lubricants and coolant.
<i>Tools and equipment</i> must include:	- micrometers and other measurement instruments - torque wrench.
<i>Engine</i> must include one or more of the following:	- operational multi-cylinder four-stroke petrol engine with: 2, 4, 6 or 8 cylinder configurations - overhead valve with push rods or overhead camshaft - complete multi-cylinder four-stroke engine assembly with carburettor, manifold, ignition system and flywheel.

Unit Mapping Information

No equivalent unit.

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 AURTTE008 Dismantle and assemble multi-cylinder four-stroke petrol 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:

- dismantle and assemble at least two different multi-cylinder four-stroke petrol engines.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- key aspects of work health and safety (WHS), occupational health and safety (OHS) and environmental requirements, including:
 - use of safety glasses, ear protection and safety footwear
 - use of engine dismantling and re-assembly equipment
 - collection and disposal of used engine lubricants and coolant
- types of engines and engine operating principles for:
 - four and two-stroke engines
 - single and multi-cylinder configuration, including straight, vee and horizontally-opposed engine configurations
- construction and operating principles of multi-cylinder four-stroke engine and functions of their major components
- functions of the lubricating system
- components of the lubricating system and their function, including:
 - sump
 - oil pumps
 - oil filters
 - oil galleries
- functions of the cooling system
- components of the cooling system and their function, including:
 - engine cooling galleries

- radiators and hoses
- thermostats
- types and applications of:
 - seals
 - gaskets
 - bearings
- dismantling procedures for engines, including:
 - bolt loosening sequences
 - procedures for noting component positions and order
- measurement and calculation methods for:
 - piston to bore and connecting rod bearing clearance
 - swept volume
 - clearance volume
 - compression ratio and engine capacity
- reassembly procedures for engines, including:
 - bolt tightening sequences and torque requirements
 - piston ring compression procedures
 - procedures for fitting pistons in bores in pairs
- work area clean-up and maintenance requirements.

Assessment Conditions

Assessors must satisfy SNR/AQTF assessor requirements.

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

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the engines they have dismantled and re-assembled, 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 workplace or simulated workplace
- personal protective equipment appropriate to the workplace
- two different multi-cylinder four-stroke petrol engines
- tools and measuring instruments, including lifting equipment.

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