



Australian Government

AURETR135 Apply knowledge of petrol and diesel engine operation

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with AUR Automotive Retail, Service and Repair Training Package Version 6.0

Application

This unit describes the skills and knowledge required to apply knowledge of petrol and diesel engine components and systems, as well as of the principles of engine operation, during the testing and repair of basic electrical circuits in vehicles, vessels and machinery.

The unit applies to those who work in the automotive service and repair industry. The engines include those in agricultural machinery, heavy commercial vehicles, light vehicles, vessels, mobile plant machinery, motorcycles or outdoor power equipment.

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

Unit Sector

Electrical Technical – Electrical and Electronics

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Identify relevant information relating to petrol and diesel engine operation in work activities	1.1 Identify functions of engine components during testing and repair activities 1.2 Identify functions of ignition, charging, starting and engine management systems during testing and repair activities
2. Apply knowledge of petrol and diesel engine operation in work activities	2.1 Identify effect of electrical system on engine performance during testing and repair activities 2.2 Apply knowledge of the relationship that a four-stroke cycle petrol engine has with vehicle ignition, starting, air and fuel delivery and cooling systems

ELEMENT	PERFORMANCE CRITERIA
	2.3 Apply knowledge of the relationship that a diesel engine has with vehicle ignition, starting, air and fuel delivery and cooling systems
3. Evaluate knowledge of petrol and diesel engine operation	3.1 Regularly check knowledge with colleagues and supervisor 3.2 Update knowledge as required according to role requirements

Foundation Skills

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

SKILL	DESCRIPTION
Learning	Locates required sources of information efficiently
Reading	Interprets a range of technical information relating to petrol and diesel engines and their operation
Numeracy	- Interprets numbers and units relating to petrol and diesel engines in automotive technical information - Uses basic mathematical operations to calculate engine dimensions, such as bore, stroke power, and torque - Interprets numbers and units used with measuring equipment, such as compression gauges and cylinder leakage testers.

Unit Mapping Information

Supersedes and is equivalent to AURETR035 Apply knowledge of petrol and diesel engine operation.

Links

Companion Volume Implementation Guide is found on VETNet -

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

Assessment Requirements for AURETR135 Apply knowledge of petrol and diesel engine operation

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- apply knowledge of petrol and diesel engine operation during the testing and repair of three different vehicle, vessel or machinery electrical systems
- evaluate and expand knowledge of petrol and diesel engine operation, including demonstrating knowledge of one of the following:
 - a new automotive petrol and diesel engine testing procedure
 - a new automotive petrol and diesel engine repair procedure
 - a new automotive petrol and diesel engine technology.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- methods to locate and interpret sources of technical information relevant to automotive electrical systems, including:
 - workplace service information
 - automotive engine mechanical texts
 - vehicle workshop manuals
 - service bulletins
 - technical articles
 - automotive textbooks
- classifications of engines, including:
 - internal combustion
 - reciprocating and rotary engines
 - spark ignition engines
 - compression ignition engines
 - engine cylinder arrangements

- engine configurations, including:
 - inline engines, V type engines and slant cylinder engines
 - opposed cylinder engines
- camshaft and valve locations, including:
 - overhead cam (OHC)
 - overhead valve (OHV)
- engine operating principles, including:
 - two-stroke cycles
 - four-stroke cycles
- engine measurement and performance ratings
- operating performance of engines, including:
 - petrol engines
 - diesel engines
- petrol and diesel engine operation, including:
 - engine construction
 - engine types and configuration
 - two-stroke and four-stroke
 - cycles of engine operation, including:
 - intake stroke
 - compression stroke
 - power stroke
 - exhaust stroke
 - firing orders
 - ignition types, including:
 - spark
 - compression
 - engine mounting location, including:
 - front longitudinal
 - front transverse
 - mid transverse
 - measurement and performance, including:
 - bore and stroke
 - displacement
 - compression ratio
 - engine efficiency
 - torque versus horsepower
- engine components, including:
 - top of engine, including:
 - timing belt or chain
 - camshaft timing pulley

- camshaft single and dual
- rocker arms and shafts
- intake valves and springs
- exhaust valves and springs
- cylinder head
- front of engine, including:
 - crankshaft
 - crankshaft timing pulley
 - crankshaft pulley and balancer
- rear of engine, including:
 - flywheel
 - starter ring gear
- bottom of engine, including:
 - engine block
 - crankshaft
 - crankshaft balance weights
 - crankshaft main bearing journals
 - pistons
 - connecting rods
- relationships between electrical systems and engine performance, including:
 - ignition system and engine power and torque, including:
 - ignition timing
 - combustion stroke pressure
 - diesel injection system and engine power and torque, including:
 - injection timing
 - combustion stroke pressure
 - starter motor system, including:
 - current draw of starting system of high compression engines
 - types of batteries and starter motors for petrol and diesel engines
 - wiring requirements of starter motor systems for petrol and diesel engines
 - charging system, including system requirements for low and high-speed engines.

Assessment Conditions

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 having applied knowledge of petrol and diesel engine systems and components to the vehicles and machinery that they have worked on, e.g. work 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:

- technical information relating to petrol and diesel engines
- automotive tools and electrical test equipment relating to the system being tested or repaired
- three different vehicles, vessels or machinery with functional electrical systems.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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