



Australian Government

AURETR035 Apply knowledge of petrol and diesel engine operation

Release: 1

AURETR035 Apply knowledge of petrol and diesel engine operation

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes 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.

It applies to those working 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.

Competency Field

Electrical

Unit Sector

Technical - Electrical and Electronic

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 relevant information relating to petrol and diesel engine operation in work	1.1 Functions of engine components are identified during testing and repair activities 1.2 Functions of <i>engine-related electrical systems</i> are identified during testing and repair activities

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.
activities	
2. Apply knowledge of petrol and diesel engine operation in work activities	2.1 Effect of electrical system on engine performance is identified during testing and repair activities 2.2 Knowledge is applied of the relationship that a four-stroke cycle petrol engine has with vehicle ignition, starting, air and fuel delivery and cooling systems 2.3 Knowledge is applied 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 Knowledge is regularly checked with colleagues and supervisor to ensure currency and accuracy 3.2 Knowledge is updated as required to complement own work role

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 a range of technical information relating to petrol and diesel engines and their operation.
Numeracy skills to:	- interpret numbers and units relating to petrol and diesel engines in automotive technical information - use basic mathematical operations to calculate engine dimensions, such as bore, stroke power, and torque - interpret numbers and units used with measuring equipment, such as compression gauges and cylinder leakage testers.

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>Engine-related electrical systems</i> must include:	• ignition system • charging system • starting system • engine management system.
---	---

Unit Mapping Information

Equivalent to AURETR2035 Demonstrate knowledge of petrol and diesel engine operation

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 AURETR035 Apply knowledge of petrol and diesel engine operation

Modification History

Release	Comment
Release 1	New unit of competency.

Performance Evidence

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

- 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

Individuals must be able to demonstrate knowledge of:

- types and location of 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

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 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.

Links

Companion Volume implementation guides are found in VETNet -

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

Companion Volume implementation guides are found in VETNet -

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