



Australian Government

AURTTL011 Diagnose complex faults in CNG fuel systems

Release: 1

AURTTL011 Diagnose complex faults in CNG fuel systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to diagnose complex faults in compressed natural gas (CNG) fuel systems and determine the repair action necessary to restore system performance. It involves confirming the existence of a fault, choosing the diagnostic procedure and tools, applying the diagnostic procedure, reporting conclusions and making repair recommendations.

Complex faults are outside the normal scope of a technician's diagnosis and repair work. They include intermittent faults, multi-system faults, faults introduced as a result of system repairs, and indirect faults caused by the influence of external systems, requiring the application of complex diagnostic processes to resolve.

It applies to those working in the automotive service and repair industry. The CNG fuel systems include those in vehicles from all sectors of the industry.

Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Competency Field

Mechanical Miscellaneous

Unit Sector

Technical - Alternative Fuels

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.

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. Identify and confirm the work requirement	1.1 Nature and objective of diagnosis requirements are determined from workplace instructions 1.2 Existence of fault in CNG fuel system is confirmed from direct or indirect evidence 1.3 Hazards associated with the work are identified and risks are managed according to workplace procedures, and <i>safety and environmental requirements</i>
2. Prepare to carry out diagnosis	2.1 Manufacturer specifications and other technical information for CNG fuel system are accessed and interpreted 2.2 Diagnostic procedures and options are identified 2.3 Diagnostic method sequence, tests and testing processes are selected from the range of available options 2.4 Testing equipment is selected and prepared according to manufacturer specifications and workplace procedures 2.5 Tools, equipment and materials required to support the diagnostic process are identified, selected and prepared for use
3. Apply diagnostic procedures	3.1 Selected diagnostic process is followed and testing is carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.2 Diagnostic findings are confirmed, as required, by using reliable alternative or optional process according to manufacturer specifications and workplace procedures 3.3 Conclusions are drawn from findings and documented according to workplace procedures, including recommendations for necessary repairs that comply with AS/NZS 2739 Natural gas (NG) fuel systems for vehicle engines 3.4 Conclusions are provided to appropriate personnel or customer to confirm further action to be taken
4. Complete work processes	4.1 Vehicle or machinery is presented ready to be repaired or returned to the customer 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

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 and evaluate appropriate sources of information efficiently - apply diagnostic skills to different CNG fuel systems.
Reading skills to:	research, organise and interpret technical information from manufacturer and workshop literature when seeking CNG fuel system 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, gain information from customers and supervisors, report diagnostic findings and make repair recommendations.
Numeracy skills to:	- measure CNG fuel system components and use basic mathematical operations, including addition and subtraction, to calculate tolerances and deviations from manufacturer specifications - use gauges and interpret units, such as kilopascals and pounds per square inch (PSI).
Planning and organising skills to:	plan own work requirements and prioritise and sequence actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	- use precision measuring equipment, such as micrometers - use specialised diagnostic equipment, such as scan tools.

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 working with lighter-than-air flammable gas - environmental requirements, including procedures for preventing loss of gas to atmosphere.
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Unit Mapping Information

Equivalent to AURTTL4011 Diagnose complex faults in CNG fuel systems

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 AURTTL011 Diagnose complex faults in CNG fuel 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:

- diagnose a complex fault in three different compressed natural gas (CNG) systems
- the above diagnosis must involve two of the following types of complex faults:
 - an intermittent fault
 - a fault that affects more than one system
 - a fault introduced as a result of a system repair
 - an indirect fault caused by the influence of external systems.

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 complex faults in CNG fuel systems, including procedures for working with lighter-than-air flammable gas
- environmental requirements, including procedures for preventing loss of gas to atmosphere
- types of complex faults relating to CNG fuel systems, including:
 - intermittent
 - multi-system
 - introduced as a result of system repair
 - indirect, caused by the influence of external systems
- types, functions and operation of CNG fuel systems, including:
 - fuel lock-offs
 - injectors

- mixers
- metering units
- requirements of AS/NZS 2739 Natural gas (NG) fuel systems for vehicle engines
- testing procedures for CNG fuel systems, including:
 - component failure analysis
 - safety component operation
 - electrical control systems
 - exhaust emissions
 - on-road fuel efficiency
 - data interpretation
- types, functions, operation and limitations of diagnostic testing equipment required to diagnose complex faults in CNG fuel systems
- procedures for accessing and interpreting scan tool system data, including:
 - diagnostic trouble codes (DTCs), including:
 - conditions that set the DTCs
 - conditions for running DTCs
 - live data
 - freeze frame data
 - waveforms
 - vehicle continuous and non-continuous monitored systems
- methods and processes for documenting and reporting diagnostic findings and recommendations.

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 CNG fuel 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:

- automotive repair workplace or simulated workplace
- workplace instructions
- AS/NZS 2739 Natural gas (NG) fuel systems for vehicle engines
- manufacturer CNG fuel system specifications
- three different CNG fuel systems with complex faults
- CNG fuel system diagnostic equipment, including scan tool

- tools, equipment and materials appropriate for diagnosing complex faults in CNG fuel systems.

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