



**Australian Government**

# **AURLTF3001 Diagnose and repair mechanical fuel injection systems**

**Release 1**

## AURLTF3001 Diagnose and repair mechanical fuel injection systems

### Modification History

Release	Comment
Release 1	Replaces AURT303166B Repair petrol fuel systems Performance Criteria, Range Statement and Critical Aspects of Evidence updated to reflect mechanical fuels injections technologies

### Unit Descriptor

Unit descriptor	<p>This unit describes the performance outcomes required to diagnose and repair mechanical fuel injection systems fitted to vehicles. It involves diagnosing deviations from correct operation, repairing mechanical fuel injection components and associated systems, and undertaking post-repair testing procedures.</p> <p>Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.</p>
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### Application of the Unit

Application of the unit	Work applies to the mechanical fuel injection systems of light vehicles in the passenger vehicle and light commercial environments.
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### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to diagnose and repair a mechanical fuel injection system	1.1. <b>Workplace instructions</b> are used to determine <b>job requirements</b> 1.2. <b>Workplace health and safety (WHS) requirements</b> are observed and applied throughout the work 1.3. <b>Procedures and information</b> are sourced and interpreted 1.4. Diagnosis options are analysed and those most appropriate to the circumstances are selected 1.5. Appropriate diagnostic tools and equipment are selected and prepared
2. Diagnose a mechanical fuel injection system	2.1. <b>Diagnostic tests</b> are performed according to workplace procedures and without causing damage to components or systems 2.2. <b>Faults</b> are identified from diagnostic test results and causes of faults are determined 2.3. Diagnosis findings are reported according to workplace procedures, including recommendations for necessary repairs or adjustments
3. Repair a mechanical fuel injection system	3.1. <b>Repair options</b> are analysed and those most appropriate to the circumstances are selected 3.2. Appropriate tools, techniques and materials are selected and prepared 3.3. Repairs and component replacements and adjustments are carried out without causing damage to components or systems and according to workplace procedures and manufacturer and component supplier specifications 3.4. <b>Post-repair testing</b> is carried out according to workplace procedures and relevant legislation
4. Clean up work area and finalise work processes	4.1. Final inspection is made to ensure work is to workplace expectations and vehicle is presented ready for use 4.2. Tools and equipment are checked and stored according to workplace expectations 4.3. Workplace documentation is processed according to workplace procedures

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

- communication skills to:
  - clarify workplace instructions and determine job requirements
  - gain information from appropriate persons and assistance as required
- initiative and enterprise skills to adapt to new and emerging situations in the workplace
- learning skills to:
  - identify sources of information, assistance and expert knowledge to expand knowledge, skills and understanding
  - participate in self-improvement activities
- literacy skills to:
  - understand quality procedures
  - read and follow information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
  - obtain and record measurements
  - document repairs and parts required
- numeracy skills to:
  - assess tolerances and apply accurate measurements and adjustments
  - interpret instruments, gauges and other measuring equipment
- planning and organising skills to:
  - plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed on time
  - identify risk factors and take action to minimise risk
- problem-solving skills to:
  - determine the underlying causes of faults
  - recognise a workplace problem or a potential problem and take action
  - refer problems outside area of responsibility to appropriate person and suggest possible causes
  - seek information and assistance as required to solve problems
- teamwork skills to apply knowledge of own role to complete activities efficiently to support team activities and tasks
- technical skills to use workplace tools relating to the repair of motorcycle braking systems, including the use of:
  - specialised tools and equipment
  - measuring equipment
  - equipment to measure and adjust exhaust emissions
- technology skills to:

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit.

- operate diagnostic and test equipment
- use technology to collect, analyse and provide information

**Required knowledge**

- WHS regulations, requirements, equipment and material, and personal safety requirements
- dangers of working with petrol
- principles of carburation
- application, purpose and operation of mechanical fuel injection systems
- testing procedures for mechanical fuel injection systems
- repair procedures for mechanical fuel injection systems
- post-repair testing procedures for mechanical fuel injection systems

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge.</p> <p>A person who demonstrates competency in this unit must be able to:</p> <ul style="list-style-type: none"> <li>• observe safety procedures and requirements</li> <li>• select methods and techniques appropriate to the circumstances</li> <li>• complete preparatory activity in a systematic manner</li> <li>• diagnose and repair a range of mechanical fuel injection systems</li> <li>• diagnose and repair mechanical fuel injection systems according to workplace, manufacturer and component supplier requirements</li> <li>• present motorcycle in a condition that complies with workplace requirements.</li> </ul>
<b>Context of, and specific resources for assessment</b>	<p>Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting.</p> <p>Assessment is to occur:</p> <ul style="list-style-type: none"> <li>• using standard workplace practices and procedures</li> <li>• following safety requirements</li> <li>• applying environmental constraints.</li> </ul> <p>Assessment is to comply with relevant:</p> <ul style="list-style-type: none"> <li>• regulatory requirements</li> <li>• Australian standards</li> <li>• industry codes of practice.</li> </ul> <p>The following resources must be made available for the assessment of this unit:</p> <ul style="list-style-type: none"> <li>• workplace location or simulated workplace</li> <li>• vehicles with mechanical fuel injection faults relevant to the qualification being sought</li> <li>• equipment appropriate for the testing of mechanical fuel</li> </ul>

**EVIDENCE GUIDE**

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**Overview of assessment**

injection systems

- specifications and workplace instructions
- tools appropriate for the repair, replacement and adjustment of light vehicle mechanical fuel injection systems.

**Method of assessment**

Assessment must satisfy the endorsed Assessment Guidelines of this Training Package.

Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with the application of required skills and knowledge.

Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application.

Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role.

Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients.

Assessment processes and techniques must be culturally sensitive and appropriate to the language, literacy and numeracy capacity of the candidate and the work being performed.



## Range Statement

### RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<b>Workplace instructions</b> may include:	<ul style="list-style-type: none"> <li>• computer-generated instructions</li> <li>• verbal instructions</li> <li>• written instructions.</li> </ul>
<b>Job requirements</b> may include:	<ul style="list-style-type: none"> <li>• mechanical fuel injection system diagnosis and repair methods, processes and equipment</li> </ul>
<b>Workplace health and safety (WHS) requirements:</b>	<ul style="list-style-type: none"> <li>• are those prescribed under legislation, regulations, codes of practice, and workplace policies and procedures</li> <li>• may include:             <ul style="list-style-type: none"> <li>• protective clothing and equipment</li> <li>• use of tools and equipment</li> <li>• handling of material</li> <li>• use of fire-fighting equipment</li> <li>• first aid equipment</li> </ul> </li> <li>• hazard control, including control of hazardous materials and toxic substances.</li> </ul>
<b>Procedures and information</b> may include:	<ul style="list-style-type: none"> <li>• verbal, written and graphical instructions</li> <li>• signage</li> <li>• work schedules, plans and specifications</li> <li>• work bulletins or memos</li> <li>• material safety data sheets (MSDS)</li> <li>• diagrams or sketches</li> <li>• safe work procedures relating to the diagnosis and repair of mechanical fuel injection systems</li> <li>• regulatory and legislative requirements relating to the automotive industry</li> <li>• Australian Design Rules</li> <li>• Engineer's design specifications and instructions</li> <li>• organisational work specifications and requirements</li> <li>• instructions issued by authorised workplace or external persons</li> <li>• Australian standards</li> <li>• light vehicle service requirements and repair manuals.</li> </ul>
<b>Diagnostic tests</b> must	<ul style="list-style-type: none"> <li>• cold-start enrichment inspection</li> <li>• cold and hot engine exhaust gas analysis.</li> </ul>

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include:	
<b><i>Diagnostic tests</i></b> may include:	<ul style="list-style-type: none"> <li>• associated component inspection and evaluation</li> <li>• fuel pump pressure, vacuum and flow tests</li> <li>• testing for air leaks</li> <li>• isolation of faults.</li> </ul>
<b><i>Faults</i></b> may include:	<ul style="list-style-type: none"> <li>• rough running</li> <li>• poor performance</li> <li>• excessive fuel consumption</li> <li>• excessive emissions (particulates, hydrocarbons, carbon monoxide, oxides of nitrogen).</li> </ul>
<b><i>Repair options</i></b> may include:	<ul style="list-style-type: none"> <li>• component repair procedures, including               <ul style="list-style-type: none"> <li>• removal, replacement and adjustment procedures</li> <li>• dismantle, repair, re-assembly and adjustment procedures.</li> </ul> </li> </ul>
<b><i>Post-repair testing</i></b> must include:	<ul style="list-style-type: none"> <li>• cold-start enrichment operation</li> <li>• exhaust gas analysis.</li> </ul>

**Unit Sector(s)**

<b>Competency field</b>	Mechanical – Light Vehicle
<b>Unit sector</b>	Technical – Fuel Systems

**Custom Content Section**

Not applicable.