



Australian Government

AURHTL4001 Inspect, repair and diagnose alternative fuel systems for heavy vehicle engines

Release 1

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Modification History

Release	Comment
Release 1	Replaces AURTH404584A Inspect, repair and diagnose alternative fuel systems for heavy vehicle engines Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to inspect, repair and diagnose and analyse alternative fuel systems in heavy vehicle engines. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.
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Application of the Unit

Application of the unit	The unit includes identification and confirmation of the work requirement, preparation for work, inspection, repair and diagnosis of alternative fuel systems for heavy vehicle engines and completion of work finalisation processes, including clean-up and documentation. Work involved includes all alternative fuel systems used for heavy vehicle engines. Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	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 performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and 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 inspect and repair alternative fuel systems in heavy vehicle engines	1.1. Nature and scope of work requirements are identified and confirmed. 1.2. WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work. 1.3. Procedures and information such as workshop manuals and specifications, and tools, are sourced. 1.4. Method options are analysed and those most appropriate to the circumstances are selected and prepared. 1.5. Technical and/or calibration requirements for the inspection of alternative fuel system for heavy vehicle engines are sourced and support equipment is identified and prepared. 1.6. Warnings in relation to working with alternative fuel systems are observed.
2. Inspect alternative fuel systems in heavy vehicle engines	2.1. Methods for system inspection are implemented in accordance with workplace procedures and manufacturer/component supplier specifications. 2.2. Inspection results are compared with manufacturer/component supplier specifications to indicate compliance or non-compliance. 2.3. Results are documented with evidence and supporting information and recommendation(s) made. 2.4. Report is processed in accordance with workplace procedures.
3. Repair alternative fuel systems in heavy vehicle engines	3.1. Methods for repairs are implemented in accordance with workplace procedures and manufacturer/component supplier specifications. 3.2. Adjustments made during repairs are in accordance with manufacturer/component supplier specifications. 3.3. Technical and/or calibration requirements for the repair of alternative fuel system for heavy vehicle engines are sourced and support equipment is identified and prepared.
4. Prepare to undertake the diagnosis of alternative fuel systems for heavy vehicle engines	4.1. Nature and scope of the work requirements are identified and confirmed. 4.2. WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work. 4.3. Procedures and information such as workshop manuals, specifications and tooling, are sourced. 4.4. Method options are analysed and those most appropriate to

ELEMENT	PERFORMANCE CRITERIA
	the circumstances are selected and prepared. 4.5. Technical and/or calibration requirements for the diagnosis of alternative fuel systems are sourced and support equipment is identified and prepared. 4.6. Warnings in relation to working with alternative fuel systems are observed.
5. Conduct alternative fuel systems for heavy vehicle engines diagnosis and analyse results	5.1. Methods for the conduct of the diagnosis are implemented in accordance with workplace procedures and manufacturer/component supplier specifications. 5.2. Alternative fuel system test results are compared with manufacturer/component supplier specifications to indicate compliance or non-compliance. 5.3. Results are documented with evidence and supporting information and recommendations(s) made. 5.4. Report is processed in accordance with workplace procedures.
6. Prepare the vehicle for use or storage	6.1. Report documentation completed. 6.2. Final inspection is made to ensure safety features are in place. 6.3. Final inspection is made to ensure work is to workplace expectations. 6.4. Vehicle is cleaned for use or stored to workplace expectations. 6.5. Job card is processed in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures
- apply analytical skills required for identification and analysis of technical information
- apply plain English literacy and communication skills in relation to dealing with customers and team members
- apply questioning and active listening skills for example when obtaining information from customers
- apply oral communication skills sufficient to convey information and concepts to customers
- apply planning and organising skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring own performance
- interact effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal
- establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage
- use mathematical ideas and techniques to calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks
- use workplace technology related to the inspection, repair and diagnosis of alternative fuel systems, including the use of specialist tooling, measuring equipment, computerised technology and communication devices and reporting/documenting of results

Required knowledge

A working knowledge of:

- WHS and environmental regulations/requirements, equipment, material and personal safety requirements.
- dangers of working with alternative fuel systems on heavy vehicle engines
- operating principles of alternative fuel systems on heavy vehicle engines
- range of common gas system faults and their causes, symptoms and effects
- diagnosis procedures
- test procedures.
- enterprise quality procedures
- work organisation and planning processes
- Australian Gas Industry Standards for automotive

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • conducting the diagnosis in accordance with workplace and manufacturer/component supplier requirements • interpreting and documenting the test results • completing the inspection ,repair and diagnosis of alternative fuel systems within workplace timeframes • vehicle presentation to customer in compliance with workplace requirements.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite. Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with regulatory requirements, including Australian and Gas Industry Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to the inspection, repair and diagnosis of alternative fuel systems • equipment, hand and power tooling appropriate to the inspection, repair and diagnosis of alternative fuel system for heavy vehicle engines • activities covering the mandatory task requirements • specifications and work instructions.
Method of assessment	Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package.

EVIDENCE GUIDE

	Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies. Assessment may be applied under project related conditions (real or simulated) and require evidence of process. Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. It is preferable assessment reflects a process rather than an event and occurs over a period of time to cover the varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other appropriate persons subject to agreed authentication arrangements. Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
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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, if used 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.

Repair methods and sequence	Repair methods and sequence are to include isolation of fault(s); dismantling, inspection and evaluation; replacement of component parts; assembly and completion of operational tests and records.
Faults	Faults to be diagnosed may include poor engine performance, abnormal consumption, engine malfunction and fuel leaks.
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices.
Safe operating procedures	Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and site visitors.
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management.
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures.
Statutory/regulatory	Statutory/regulatory authorities may include Federal,

RANGE STATEMENT

authorities	State/Territory and local authorities administering acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include hand tooling, meters, gauges, leak testing devices and decanting equipment.
Materials	Materials may include spare parts and cleaning materials.
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include site specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers.
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to the inspection, repair and diagnosis of alternative fuel system for heavy vehicle engines • regulatory/legislative requirements pertaining to the automotive industry, including Australian Design Rules, gas industry standards and Australian Standards • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons

Unit Sector(s)

Unit sector	Mechanical - Heavy Vehicle
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Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Alternative Fuels
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