



Australian Government

AURHTE102 Diagnose and repair heavy vehicle compression ignition engines

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 diagnose and repair faults in the compression ignition engines of heavy vehicles. The unit involves preparing for the task, sourcing a diagnostic testing strategy, diagnosing the cause of the fault, carrying out the repair, performing post-repair testing, and completing workplace processes and documentation.

The unit applies to those who work in the automotive service and repair industry. The compression ignition engines include those in agricultural machinery, heavy commercial vehicles, mobile plant machinery or marine vessels.

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

Unit Sector

Mechanical – Heavy Vehicle Technical – Engines

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. Prepare to diagnose and repair engine	1.1 Identify job requirements from workplace instructions 1.2 Identify required information for diagnosis activity 1.3 Analyse diagnostic options and source testing strategy to identify cause of fault using workplace and manufacturer procedures 1.4 Identify hazards and environmental issues associated with diagnose and repair activity, assess potential risks and implement control measures in line with workplace policies

ELEMENT	PERFORMANCE CRITERIA
	and procedures 1.5 Identify tools and equipment required for testing strategy and establish serviceability according to workplace procedures
2. Diagnose engine	2.1 Implement diagnostic tests set out in testing strategy according to manufacturer and workplace procedures, and workplace health and safety requirements 2.2 Identify cause of fault through analysis of diagnostic test results 2.3 Confirm and report cause of fault according to workplace procedures 2.4 Develop and report recommendations for necessary repairs according to workplace procedures
3. Repair engine	3.1 Identify required information for repair activity 3.2 Identify tools, equipment and materials required for repair activity and establish serviceability according to workplace procedures 3.3 Carry out repairs according to workplace and manufacturer procedures, manufacturer specifications, workplace health and safety and environmental requirements 3.4 Carry out post-repair testing according to workplace procedures, workplace health and safety and environmental requirements
4. Complete work processes	4.1 Conduct final inspection according to workplace procedures and confirm vehicle is ready for use 4.2 Clear work area and dispose of or recycle materials according to workplace procedures 4.3 Complete documentation according to workplace procedures

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 - Develops a sequenced plan for a specific task
Reading	Organises and interprets technical information from workplace procedures, manufacturer procedures and manufacturer specifications

SKILL	DESCRIPTION
Oral communication	• Clarifies instructions • Obtains information from customers and supervisors
Numeracy	• Measures engine components • Uses mathematical operations • Calculates distances, areas, volumes and tolerances • Calculates deviations from manufacturer specifications
Planning and organising	• Plans own work requirements • Prioritises actions to achieve required outcomes • Ensures tasks are completed within workplace timeframes
Technology	• Uses precision measuring equipment

Unit Mapping Information

Supersedes and is equivalent to AURHTE002 Diagnose and repair heavy vehicle compression ignition engines.

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 AURHTE102 Diagnose and repair heavy vehicle compression ignition engines

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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:

- diagnose and repair a fault in at least two heavy vehicle compression ignition engines.

In the course of the above work, the candidate must:

- diagnose and repair a fault in:
 - an engine cylinder head, which must include removing the cylinder head from the engine
 - an engine bottom end, which must include removing the crankshaft, pistons and connecting rods from the engine
- dismantle and reassemble one of the above compression ignition engines, ensuring that the engine is running at the end of the repair.

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 information required to diagnose and repair heavy vehicle compression ignition engines, including:
 - information provided by customers and supervisors
 - manufacturer specifications and procedures or equivalent documentation
- workplace procedures required to diagnose and repair heavy vehicle compression ignition engines, including:
 - establishing serviceability of tools and equipment
 - documentation procedures
 - housekeeping procedures, including:
 - examination of tools and equipment
 - storage of equipment

- identification, tagging and isolation of faulty equipment
 - disposal of excess materials
 - recycling procedures
- workplace health and safety (WHS) requirements relating to diagnosing and repairing heavy vehicle compression ignition engines, including procedures for:
 - isolating and stabilising heavy vehicles or machines
 - lifting and supporting heavy vehicle compression ignition engines
 - working with compression ignition engines
- environmental requirements relating to diagnosing and repairing heavy vehicle compression ignition engines, including procedures for trapping, storing and disposing of fluids released from compression ignition engines
- operating principles of heavy vehicle compression ignition engines, including:
 - combustion, including:
 - combustion cycles
 - swept volume and engine volume
 - compression ratio
 - engine efficiency, including volumetric efficiency, thermal efficiency and mechanical efficiency
 - torque and horsepower, including brake horsepower
- purpose and operation of heavy vehicle compression ignition engines and components, including:
 - lubrication system, cylinder blocks, cylinder liners, pistons, cylinder heads, combustion chambers, inlet and exhaust manifolds, connecting rods, crankshafts, pistons, piston rings, gudgeon pins, camshafts, timing gears, vibration dampers and flywheels
- diagnostic testing procedures for heavy vehicle compression ignition engines, including:
 - scan tool testing
 - engine compression tests
 - cylinder leakage tests
 - oil pressure tests
 - checking sources of fluid leaks
 - exhaust smoke diagnosis
 - checking abnormal engine noises
- dismantling, inspection and reassembly procedures for heavy vehicle compression ignition engines, including procedures for:
 - measuring clearances and tolerances, including:
 - crankshaft and camshaft bearings and journals
 - main bearing and connecting rod tunnels
 - cylinder bores and pistons
 - liner depths and protrusions
 - cylinder heads

- inspecting components
- repair procedures for heavy vehicle compression ignition engines, including procedures for removing and refitting the:
 - cylinder head
 - piston and connecting rod
 - crankshaft
 - cylinder liner
- post-repair testing procedures for heavy vehicle compression ignition 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 the heavy vehicle compression ignition engines 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
- manufacturer engine specifications
- two different heavy vehicle compression ignition engines with faults
- diagnostic equipment for heavy vehicle compression ignition engines
- tools, equipment and materials appropriate for repairing and adjusting heavy vehicle compression ignition engines.

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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