



Australian Government

AURHTE002 Diagnose and repair heavy vehicle compression ignition engines

Release: 1

AURHTE002 Diagnose and repair heavy vehicle compression ignition engines

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to diagnose and repair faults in heavy vehicle compression ignition engines. It involves preparing for the task, selecting the correct diagnostic procedure, carrying out the diagnosis and the repair, performing post-repair testing, and completing workplace processes and documentation.

It applies to those working 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.

Competency Field

Mechanical - Heavy Vehicle

Unit Sector

Technical - Engines

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. Prepare to diagnose and repair heavy vehicle compression ignition	1.1 Job requirements are determined from workplace instructions 1.2 Diagnostic information is sourced and interpreted 1.3 Diagnostic options are analysed and those most appropriate to the

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.
engine	circumstances are selected 1.4 Hazards associated with the work are identified and risks are managed 1.5 Diagnostic tools and equipment are selected and checked for serviceability
2. Diagnose engine	2.1 Diagnostic tests are carried out according to manufacturer specifications, workplace procedures, and environmental and safety requirements 2.2 Faults are identified from diagnostic test results and causes of faults are determined 2.3 Diagnosis findings, including recommendations for necessary repairs or adjustments, are reported according to workplace procedures
3. Repair engine	3.1 Repair information is sourced and interpreted 3.2 Repair options are analysed and those most appropriate to the circumstances are selected 3.3 Repair tools, equipment and materials are selected and checked according to manufacturer procedures 3.4 Repairs and component replacements and adjustments are carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements , and without causing damage to components or systems 3.5 Post-repair testing is carried out according to workplace procedures to confirm fault rectification, and any further problems detected as having been introduced during the repair process are rectified
4. Complete work processes	4.1 Final inspection is made to ensure work is to workplace expectations and engine or vehicle is presented ready for use 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 4.4 Workplace documentation is processed 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 appropriate sources of information efficiently.
Reading skills to:	interpret information from manufacturer and workshop literature when seeking engine 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 - report diagnostic findings and make repair recommendations.
Numeracy skills to:	- use basic mathematical operations, including addition, subtraction, multiplication and division to calculate distances, areas, volumes, tolerances and deviations from manufacturer specifications - interpret specialised measurement and calibration equipment scales.
Planning and organising skills to:	plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	- use compression ignition engine test and diagnosis equipment - use precision measuring equipment, such as micrometers and dial bore gauges.

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 requirements</i> must include:	- work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: - isolating and stabilising heavy vehicles or machines - lifting and supporting heavy vehicle compression ignition engines - operating compression ignition engines.
<i>Environmental</i>	procedures for trapping, storing and disposing of oil and fluid

requirements must include:	released from compression ignition engines.
-----------------------------------	---

Unit Mapping Information

Equivalent to AURHTE3002 Repair engines and associated engine components (heavy vehicle)

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 AURHTE002 Diagnose and repair heavy vehicle compression ignition engines

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 standards defined in this unit's elements, performance criteria, range of conditions and foundation skills:

- diagnose and repair a fault in two different heavy vehicle compression ignition engines, including diagnosing and repairing 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 engine is running at the end of the repair.

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 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, including procedures for trapping, storing and disposing of oil and fluid released from compression ignition engines
- operating principles of heavy vehicle compression ignition engines and associated components, including:
 - combustion, including:
 - combustion cycle

- swept volume and engine volume
- compression ratio
- valve timing
- engine efficiency, including volumetric efficiency, thermal efficiency and mechanical efficiency
- torque and horsepower, including brake horsepower
- application, 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:
 - engine compression tests
 - cylinder leakage tests
 - oil pressure tests
 - source of fluid leak diagnosis
 - exhaust smoke diagnosis
 - abnormal engine noise diagnosis
- 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

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 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.

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>