



Australian Government

AURHTX001 Diagnose and repair heavy vehicle manual transmissions

Release: 1

AURHTX001 Diagnose and repair heavy vehicle manual transmissions

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to diagnose and repair faults in the manual transmissions of heavy vehicles. 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 manual transmissions include those in agricultural machinery, heavy commercial vehicles or mobile plant machinery.

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

Competency Field

Mechanical - Heavy Vehicle

Unit Sector

Technical - Transmission

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 manual transmission	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

	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 manual transmission	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 manual transmission	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 vehicle or transmission 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
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Learning skills to:	locate appropriate sources of information efficiently.
Reading skills to:	interpret information from manufacturer and workshop literature when seeking manual transmission 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:	- measure transmission system components and use basic mathematical operations, including addition, subtraction, multiplication and division, to calculate distances, tolerances and deviations from manufacturer specifications - calculate gear ratios and torque reduction and multiplication.
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 precision measuring equipment, such as vernier calipers and micrometers.

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: - using transmission lifting and supporting equipment - manual handling heavy vehicle manual transmissions.
<i>Environmental requirements</i> must include:	procedures for trapping, storing and disposing of clutch dust, brake fluid and oils released from manual transmissions.

Unit Mapping Information

Equivalent to AURHTX3001 Repair transmissions - manual (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 AURHTX001 Diagnose and repair heavy vehicle manual transmissions

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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:

- disassemble and reassemble one heavy vehicle manual transmission that has a minimum of 9 speeds.
- diagnose and repair a fault in three of the following components of a heavy vehicle manual transmission:
 - input shaft
 - gear shift mechanisms
 - gears and shafts
 - transmission bearings
 - auxiliary section and controls
 - gasket and seal leaks
- remove, refit or replace a heavy vehicle manual transmission.

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 transmissions, including procedures for:
 - using transmission lifting and supporting equipment
 - manual handling heavy vehicle manual transmissions
- environmental requirements, including procedures for trapping, storing and disposing of clutch dust, brake fluid and oils released from manual transmissions
- operating principles of heavy vehicle manual transmissions and associated components, including:

- gears, including:
 - gear types
 - gear ratios and torque reduction and multiplication
 - simple gear trains
 - compound gear trains
- application, purpose and operation of heavy vehicle manual transmissions and components, including:
 - power flows, including:
 - longitudinal manual transmissions
 - transfer cases
 - synchromesh operation
 - gearshift mechanisms, including:
 - mechanical
 - air
 - electrical/pneumatic
 - electronically automated manual transmissions
 - transfer cases
 - power take-off
- diagnostic testing procedures for heavy vehicle manual transmissions, including:
 - abnormal noise diagnosis
 - electronic diagnosis
 - shift diagnosis
- dismantling procedures for heavy vehicle manual transmissions, including:
 - measuring clearances and tolerances
 - inspecting components
- repair procedures for heavy vehicle manual transmissions, including:
 - gears, shafts and bearings
 - electronic control systems
 - gear shift mechanism
- post-repair testing procedures for heavy vehicle manual transmissions.

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 trailer electronically controlled roll stability 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
- manufacturer manual transmission specifications
- one heavy vehicle with faults in its manual transmission that has a minimum of 9 speeds
- diagnostic equipment for heavy vehicle manual transmissions
- tools, equipment and materials appropriate for repairing and adjusting heavy vehicle manual transmissions.

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