



Australian Government

AURHTX101 Diagnose and repair heavy vehicle manual transmissions

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 manual transmissions 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 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.

Unit Sector

Mechanical – Heavy Vehicle Technical – Transmissions

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 heavy vehicle manual transmission	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 and procedures

ELEMENT	PERFORMANCE CRITERIA
	1.5 Identify tools and equipment required for testing strategy and establish serviceability according to workplace procedures
2. Diagnose heavy vehicle manual transmission	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 heavy vehicle manual transmission	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 manual transmission components • Uses mathematical operations • Calculates deviations and tolerances from manufacturer specifications • Calculates gear ratios • Calculates torque reduction and multiplication
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 AURHTX001 Diagnose and repair heavy vehicle manual transmissions.

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 AURHTX101 Diagnose and repair heavy vehicle manual transmissions

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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:

- disassemble and reassemble one heavy vehicle manual transmission that has a minimum of nine speeds
- diagnose and repair a fault in at least 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

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 manual transmissions, including:
 - information provided by customers and supervisors
 - manufacturer specifications and procedures or equivalent documentation
- workplace procedures required to diagnose and repair heavy vehicle manual transmissions, 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 manual transmissions, including procedures for:
 - using transmission lifting and supporting equipment
 - manual handling heavy vehicle manual transmissions
- environmental requirements relating to diagnosing and repairing heavy vehicle manual transmissions, including procedures for trapping, storing and disposing of clutch dust, clutch fluid and oils released from manual transmissions
- operating principles of heavy vehicle manual transmissions and associated 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

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.

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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