

## Demonstrate knowledge of light vehicle automatic transmission components and fault diagnosis procedures

**Level** 4

**Credits** 8

**Purpose** This theory-based unit standard is for people in the automotive repair industry. People credited with this unit standard are able to demonstrate knowledge of: torque converters; light vehicle automatic transmission gear trains; hydraulic systems used in light vehicle automatic transmissions; and light vehicle automatic transmission fault diagnosis procedures.

**Subfield** Motor Industry

**Domain** Automotive Transmission Systems

**Status** Registered

**Status date** 25 February 2008

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**Entry information** Recommended: Unit 24336, *Demonstrate knowledge of light vehicle automatic transmissions and their servicing requirements*, or demonstrate equivalent knowledge and skills.

**Accreditation** Evaluation of documentation and visit by NZQA and industry.

**Standard setting body (SSB)** NZ Motor Industry Training Organisation (Incorporated)

**Accreditation and Moderation Action Plan (AMAP) reference** 0014

This AMAP can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

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## Special notes

### Definitions

*Light vehicle* refers to classes as listed from Land Transport New Zealand website table <http://www.landtransport.govt.nz/publications/infosheets/infosheet-1-10.html#classes>:

passenger vehicle MA, MB, MC; omnibus MD, MD1, MD2; and goods vehicle NA.

*Service information* may include but is not limited to – technical information of a vehicle, machine, or product detailing operation; installation and servicing procedures; manufacturer instructions and specifications; technical terms and descriptions; and detailed illustrations. This can be accessed in hard copy or electronic format and is normally sourced from the manufacturer.

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## Elements and performance criteria

### Element 1

Demonstrate knowledge of torque converters.

#### Performance criteria

- 1.1 The general construction of a torque converter is described in accordance with service information.
- 1.2 How the torque converter transmits power and how it multiplies torque are explained in accordance with service information.
- 1.3 The location and purpose of a lockup clutch are described in accordance with service information.
- 1.4 How a lockup clutch is applied is described in accordance with service information.

### Element 2

Demonstrate knowledge of light vehicle automatic transmission gear trains.

#### Performance criteria

- 2.1 The main components of a planetary gear set are identified, and the methods of achieving forward and reverse motion, increase and decrease in speed, and direct drive are explained in accordance with service information.  
  
Range components – sun gear, planet gear carrier, planetary gears (pinions), annulus (ring gear).
- 2.2 The basic power flow is traced out for each item in each range from the input to output shafts.  
  
Range park, reverse, neutral, drive, first gear, second gear, third gear.

2.3 Characteristics and operation of compound gear sets are described in accordance with service information.

Range Simpson, Ravigneaux, Wilson, Lepelletier.

### **Element 3**

Demonstrate knowledge of hydraulic systems used in light vehicle automatic transmissions.

#### **Performance criteria**

3.1 The requirements of an automatic transmission fluid are described in accordance with service information.

Range power transmission, cooling, lubrication, no loss of clutch friction, hydrostatic control.

3.2 The purpose of the pump, and a means of driving it, are described in accordance with service information.

3.3 Clutches, bands, and servos are identified, and their function and operation (including overlap shift control) described in accordance with service information.

3.4 The methods of deriving line pressure, throttle pressure, and governor pressure are described in accordance with service information.

3.5 The uses for line, throttle, and governor pressures of automatic transmissions are described in accordance with service information.

Range up-shift, down-shift, kick-down, lockup.

3.6 Electronic control operation (including driver shift override) is described in accordance with service information.

### **Element 4**

Demonstrate knowledge of light vehicle automatic transmission fault diagnosis procedures.

#### **Performance criteria**

4.1 Procedures to gather data as an aid to diagnosing faults are described in accordance with service information.

Range includes but is not limited to – customer and/or driver complaint, obtaining technical service information, accessing fault codes, visual inspection, fluid check, pressure checks, road test.

- 4.2 Procedures, precautions, and limitations required to carry out a stall test are described in accordance with service information.
- 4.3 Transmission fluid appearance as an aid to diagnosis is described in accordance with manufacturer service information.
- Range colour, odour, solid particles, water ingress.
- 4.4 Procedures to determine source of external fluid leaks are described in accordance with service information.
- 4.5 The use of fault finding charts to diagnose faults is explained in accordance with service information.
- Range includes but is not limited to – poor shift quality, failure to start or starting in drive gears, slippage, abnormal noise, no drive, no park lock.

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### **Please note**

Providers must be accredited by NZQA, or an inter-institutional body with delegated authority for quality assurance, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

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### **Comments on this unit standard**

Please contact the NZ Motor Industry Training Organisation (Incorporated) [info@mito.org.nz](mailto:info@mito.org.nz) if you wish to suggest changes to the content of this unit standard.