

Title	Demonstrate knowledge of heavy machine manual and power shift transmissions		
Level	3	Credits	4

Purpose	This theory-based unit standard is for people in the automotive heavy repair industry. People credited with this unit standard are able to demonstrate knowledge of heavy machine manual transmissions, and heavy machine power shift transmissions.
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Classification	Motor Industry > Automotive Transmission Systems
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Available grade	Achieved
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Guidance Information

Definition

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.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of heavy machine manual transmissions.

Performance criteria

1.1 The types of gears used in a heavy machine manual transmission are identified in accordance with service information.

Range spur, helical, epicyclic.

1.2 The applications of spur, helical, and epicyclic gears are explained in accordance with service information.

1.3 The component parts of selector mechanisms are identified, and their function described, in accordance with service information.

Range rails, forks, detents, remote controls.

- 1.4 Methods of lubricating gears, bearings, and bushes are described in accordance with service information.
- Range pressure feed, splash, slinger, sealed, impregnated.
- 1.5 Shaft layouts and locations are described, and power flow paths determined, in accordance with service information.
- Range includes but is not limited to – single and twin countershaft units, high-low ratio units, shuttle forward and reverse units.
- 1.6 The purpose and operation of a synchromesh unit are described in accordance with service information.
- 1.7 Clutch assembly operation is described in accordance with service information.
- Range includes but is not limited to – single and dual dry clutch packs, power take off (PTO) clutches, clutch adjustments, clutch levers.

Outcome 2

Demonstrate knowledge of heavy machine power shift transmissions.

Performance criteria

- 2.1 Power flows through an epicyclic gear train are described in accordance with service information.
- Range planetary reduction, planetary overdrive, planetary reverse, planetary direct drive, planetary neutral.
- 2.2 Hydraulic pumps and controls are identified in accordance with service information.
- Range hydraulic pumps – vane, gear, piston; controls – control valves, piping, relief valves, cylinders and actuators, control levers.
- 2.3 Hydraulic clutch packs are identified in accordance with service information.
- Range clutch drums, clutch plates, linings.
- 2.4 Hydraulic brake systems are described in accordance with service information.
- Range interaction valve systems, brake bands, linings.
- 2.5 Methods of testing hydraulically operated and controlled systems are described in accordance with service information.
- Range includes but is not limited to – pressure testing hydraulic systems, critical adjustments.

Replacement information	This unit standard, unit standard 2318, and unit standard 2319 were replaced by unit standard 31227.
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This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	27 February 1995	31 December 2020
Review	2	21 February 1999	31 December 2020
Review	3	25 February 2008	31 December 2020
Review	4	26 July 2018	31 December 2020

Consent and Moderation Requirements (CMR) reference	0014
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.