

Title	Demonstrate knowledge of transmission requirements for competition race vehicles		
Level	3	Credits	4

Purpose	This theory-based unit standard is for people who work in a motorsport environment. People credited with this unit standard are able to demonstrate knowledge of types and features of transmission systems used in competition race vehicles, and specific differences between competition race vehicle transmissions and standard transmissions.
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Classification	Motor Industry > Automotive Transmission Systems
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Available grade	Achieved
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Guidance Information

- 1 Publications relevant to this unit standard include but are not limited to – MotorSport New Zealand regulations, *New Zealand MotorSport Manual No 33*.
- 2 The MotorSport New Zealand regulations (motorsport regulations) and the *New Zealand MotorSport Manual* (motorsport manual) are available from the MotorSport New Zealand website <http://www.motorsport.org.nz/>. The Motorsport Manual is subject to frequent amendment, and any amendments will take precedence for assessment purposes, pending the review of this unit standard.
- 3 Definitions
Company requirements refer to instructions to staff on policy and procedures which are documented in memo or manual format and are available in the workplace. These requirements include but are not limited to – company specifications and procedures, work instructions, manufacturer specifications, product quality specifications, and legislative requirements.
Vehicle transmissions refer to gearboxes, gear change mechanisms, clutch assemblies, drive line (shaft) components, and final drive units.
- 4 This standard has been developed for use by the sectors of motorsport aligned with MotorSport New Zealand. Due to its requirements, it is not intended or suitable for use on motorcycles.
- 5 Recommended entry information: Unit 920, *Describe the construction and operation of manual and semi-automatic transmissions used on light vehicles*.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of types and features of transmission systems used in competition race vehicles.

Performance criteria

- 1.1 Types of competition race vehicle transmission systems are described in accordance with company requirements.
- Range gearboxes – inline, transaxle, four-wheel drive, clutchless, reverse rotation;
gear shift mechanisms – H pattern, W pattern, sequential, electronic paddle shift, cable routing;
clutch assemblies – sintered bronze metallic, organic, sintered iron metallic, single plate, twin plate, triple plate, four plate, pull-type clutch, push-type clutch, slipper clutch, break-away torque rated clutches, performance flexiplates, performance flywheels;
driveline (shaft) components – constant velocity (CV) joints, universal joints, pre-loaded bearings;
final drive units – torque-biasing differential, performance limited slip differential.
- 1.2 Features of competition race vehicle gearboxes are described in accordance with company requirements.
- Range gears – gear strength, quick change gear sets, straight cut gears, coating treatments, and profile;
shift mechanisms – quick change (manual and electronic control), interlocking systems;
oil systems – pumps, coolers, filters, dry sump types;
weight requirements;
racing gear oil.
- 1.3 Gear ratio and torque requirement calculations are described in accordance with event and circuit requirements, vehicle specifications, motorsport regulations and company requirements.

Outcome 2

Demonstrate knowledge of specific differences between competition race vehicle transmissions and standard transmissions.

Performance criteria

2.1 Requirements for competition race vehicle transmissions, compared to standard transmissions, are described in accordance with manufacturer specifications.

Range ability to manage high brake horsepower ratings, ability to withstand extreme operating and race conditions, heat dispersion (cooler, ducting, heat sinks), quick change requirements, ability to quick-change gear ratios, weight considerations, compactness, interchangeability of bell housings and mountings.

2.2 Specific differences between competition race vehicle transmissions and standard transmissions are described in accordance with manufacturer specifications.

Range higher machining tolerances, gear profile and treatment for additional strength, additional internal strengthen and bearing support, compact and aerodynamic design, driver safety considerations, weight, materials used in the manufacture.

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	25 June 2007	31 December 2020
Review	2	26 April 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>.