

<b>Title</b>	<b>Demonstrate knowledge of fine tuning competition race vehicle steering and suspension systems to suit motorsport events</b>		
<b>Level</b>	<b>5</b>	<b>Credits</b>	<b>8</b>

<b>Purpose</b>	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 the requirements for fine tuning competition race vehicle steering and suspension systems; and procedures to carry out fine tuning of steering and suspension for a competition race vehicle.
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<b>Classification</b>	Motor Industry > Vehicle Steering and Suspension
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<b>Available grade</b>	Achieved
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### Guidance Information

- Publications relevant to this unit standard include but are not limited to – MotorSport New Zealand regulations, *New Zealand MotorSport Manual No 33*.
- 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.
- 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.

*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.
- 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.  
Motorcycle candidates should refer to: Unit 21104, *Demonstrate knowledge of fine tuning motorcycle steering, suspension, and frame*.

- 5 Recommended entry information: Unit 23822, *Demonstrate knowledge of competition race vehicle steering and suspension systems to suit motorsport events*; and Unit 23803, *Demonstrate knowledge of competition race vehicle electronic data analysis systems*.

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## Outcomes and performance criteria

### Outcome 1

Demonstrate knowledge of the requirements for fine tuning competition race vehicle steering and suspension systems.

### Performance criteria

- 1.1 All steering and suspension system components that can be fine tuned are identified and described in relation to improving the handling and stability of a vehicle.
- 1.2 An analysis of competition race vehicle and driver requirements is completed and describes factors to consider when fine tuning steering and suspension systems.
- Range requirements include but are not limited to – vehicle weight, type of event, mechanical limitations of the competition race vehicle, amount and type of adjustment allowable, tyre profile and air pressure, spring and shock absorber rates, ride height, sway bar and anti-roll bar selection, aerodynamic aids, load transfer, structural considerations, computer analysis, interpretation of driver feedback.
- 1.3 Competition race vehicle handling terminology is defined in accordance with the service information.
- Range terminology includes but is not limited to – handling, road holding, stability, linear and angular motions (yaw, pitch, roll).
- 1.4 Geometric considerations to take into account when fine tuning competition race vehicle systems are described in terms of safety and stability.
- Range considerations include but are not limited to – steering axis, chassis rake (front-to-rear height, wet-to-dry surfaces), Ackermann steering geometry, centre of gravity, effect on brakes, aerodynamics.
- 1.5 Damping forces provided by shock absorbers are described in terms of manufacturer calibrations and component design.
- Range includes but is not limited to – shim-valving, charge pressures, oil viscosity, adjustable spring, electronic control (by-pass bleed).

1.6 An analysis identifies the variance of tuning requirements dependent on different company requirements.

Range analysis may include but is not limited to – intended event, track conditions, driver personal handling requirements, loaded weight.

1.7 Requirements when testing competition race vehicle handling characteristics are described in accordance with company requirements.

Range on terrain suitable for intended use of the vehicle, safety, motorsport regulations, computer analysis, driver feedback.

## Outcome 2

Demonstrate knowledge of procedures to carry out fine tuning of steering and suspension for a competition race vehicle.

### Performance criteria

2.1 Inspecting and testing procedures on steering and suspension components and systems required to assess competition race vehicle capabilities are described in accordance with company requirements.

2.2 Procedure to complete the fine tuning of steering and suspension systems is described in accordance with company requirements.

Range may include but is not limited to – altering or replacing steering components, altering geometry and centre of gravity, setting up and levelling scales for corner weighting, changing suspension spring and dampening rates, adjusting suspension struts and rods, altering shock absorber rates, changing or altering aerodynamic aids and air dams, ride height, changing tyres.

**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

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