



Australian Government

AURMTA008 Apply aerodynamic and vehicle dynamic principles and effects to competition vehicles

Release: 1

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Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to determine aerodynamic and vehicle dynamic requirements of competition vehicles, devise improvement strategies, apply changes and test results. It involves preparing for the task, determining optimum settings, supervising configuration adjustments, applying dynamic principles, and testing vehicle aerodynamics. It requires understanding of the terminology, principles and effects of the physics involved in resistance and motion.

It applies to those working in the motor sport industry.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Competency Field

Motor Sport

Unit Sector

Technical

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Prepare to determine optimum aerodynamic settings	1.1 Job requirements are determined from workplace instructions 1.2 Setting requirements are determined from <i>motor sport event information</i>

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
	1.3 Regulations, specifications and tolerances are examined for possible competitive advantages 1.4 Specifications are checked for required <i>known factors</i> and any required clarification of specifications is sought 1.5 Hazards associated with the work are identified and risks are managed
2. Determine optimum tyre settings	2.1 Tyre setting requirements are calculated and determined according to known factors 2.2 Effects of selected tyre settings on overall vehicle performance are evaluated 2.3 Anticipated performance improvement is quantified and optimum settings are documented
3. Determine optimum steering and suspension settings	3.1 Steering and suspension setting requirements are calculated and determined according to known factors 3.2 Effects of selected steering and suspension settings on overall vehicle performance are evaluated 3.3 Anticipated performance improvement is quantified and optimum settings are documented
4. Determine optimum aerodynamic device settings	4.1 Aerodynamic device setting requirements are calculated and determined according to known factors 4.2 Effects of selected aerodynamic device settings on overall vehicle performance are evaluated 4.3 Anticipated performance improvement is quantified and optimum settings are documented
5. Supervise configuration of aerodynamic and vehicle dynamic settings	5.1 Tooling and equipment are selected and checked for serviceability 5.2 Aerodynamic and vehicle dynamic optimum settings are configured according to team procedures and <i>safety requirements</i> 5.3 Post-configuration checks are made to ensure accurate and complete changes according to team procedures and safety requirements 5.4 Problems with work area or operation of equipment are evaluated and decisions implemented as required 5.5 Proposals for modifications or adaptation of equipment or components are evaluated and implemented as required 5.6 Work area cleanliness and layout for job requirements are monitored
6. Test aerodynamic and	6.1 Test procedures are determined and settings are tested against

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
vehicle dynamic settings	anticipated performance improvement according to team procedures and safety requirements 6.2 Testing procedure and results are documented 6.3 Recommendations for setting usage are devised and implemented
7. Complete work processes	7.1 Final inspection is made to ensure work is to workplace expectations and vehicle is presented ready for use 7.2 Work area is cleaned, waste and non-recyclable material are disposed of, and recyclable material is collected 7.3 Tools and equipment are checked and stored according to workplace procedures 7.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are not explicit in the performance criteria.

Skills	Description
Learning skills to:	adapt procedures to different vehicles, event venues and conditions.
Reading skills to:	interpret team instructions and procedures and controlling body rules, category rules and supplementary regulations.
Writing skills to:	legibly and accurately document optimum settings, performance specifications, and test results of aerodynamic and vehicle dynamic settings.
Oral communication skills to:	discuss configuration of aerodynamic and vehicle dynamic settings with team members.
Numeracy skills to:	- understand units of length, mass, velocity, angles and force - use basic mathematical operations to calculate mass, velocity, angles and force.
Planning and organising skills to:	supervise configuration of vehicle settings to minimise time and material wastage.
Problem solving skills to:	analyse a number of factors, including event regulations and vehicle and event conditions, and determine optimum

Skills	Description
	aerodynamic and vehicle dynamic settings.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Motor sport event information</i> must include:	- controlling body rules - category rules - supplementary regulations - component supplier specifications - team requirements.
<i>Known factors</i> must include:	- regulatory constraints - budgetary constraints - load and speed characteristics - terrain and climate conditions - driver or rider preferences.
<i>Safety requirements</i> must include:	work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for identifying hazards and managing risks.

Unit Mapping Information

Equivalent to AURMTA5008 Apply aerodynamic and vehicle dynamic principles and effects to competition vehicles

Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURMTA008 Apply aerodynamic and vehicle dynamic principles and effects to competition vehicles

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Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standards defined in this unit's elements, performance criteria, range of conditions and foundation skills:

- determine and supervise the configuration of the following settings on two different competition vehicles:
 - tyre settings
 - steering and suspension settings
 - aerodynamic device settings.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to applying aerodynamic and vehicle dynamic principles and effects to competition vehicles, including procedures for identifying hazards and managing risks
- key requirements of controlling body rules, category rules and supplementary regulations relating to establishing settings
- terminology, principles and effects of the physics involved in resistance and motion
- aerodynamic and vehicle dynamic principles and their effects on competition vehicles, including:
 - tyre settings, including:
 - construction and compound
 - size, including stagger
 - pressures
 - loadings
 - temperatures

- steering and suspension settings, including:
 - wheel rate and linkage or leverage ratios
 - spring rate and spring pre-load
 - vehicle weight, sprung and unsprung weight
 - anti-roll bar rate where fitted
 - steering angles, including toe in and out, camber and caster
 - roll centres
 - ride height
 - centre of gravity
- aerodynamic device settings, including:
 - wing angles, height and location
 - body panels and fittings
 - ground effects and ride height
 - frontal areas
 - lift reduction and drag reduction
 - downforce generation
 - downforce and drag compromise
- competition vehicle test methods and procedures, including procedures for record keeping
- mathematical computations for determining optimum settings.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

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 competition vehicle settings they have configured, e.g. work order.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- motor sport workplace or simulated workplace
- two different competition vehicles requiring configuration resetting
- controlling body rules, category rules and supplementary regulations for a motor sport event
- tools and equipment appropriate for adjusting and modifying tyres, steering and suspension, and aerodynamic device settings.

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