AUTOMOTIVE INDUSTRY RETAIL, SERVICE & REPAIR

VOLUME 4

TRAINING PACKAGE CODE AUR 99

Endorsed by the National Training Framework Committee and agreed by Ministers 13/09/1999.
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This material contained within this volume is part of the endorsed component of the training package, this volume should not be used in isolation, but should be used in the context of the whole training package

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Training packages are not static documents. Changes are made periodically to reflect the latest industry practices.

Before commencing any form of training or assessment, you must ensure delivery is from the *current version* of the Training Package.

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Access the ATP website (http://www.atpl.net.au) and check the latest Print Number.

In cases where the Print Version Number is later than yours, the Print Version Modification History in the Training Package sample on the ATP website will indicate the changes that have been made.

The Modification History is also available on the website of the developer of the Training Package: Automotive Training Australia http://ata@automotivetraining.org.au

The National Training Information Service (http://www.ntis.gov.au) also displays any changes in Units of Competency and the packaging of qualifications.

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Cannot be read in isolation referring to Qualifications Framework in Volume 1

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Cannot be read in isolation referring to Qualifications Framework in Volume 1

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Cannot be read in isolation
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MODIFICATION HISTORY – ENDORSED MATERIALS

Please refer to the National Training Information Service for the latest version of Units of Competency and Qualification information (http://www.ntis.gov.au).

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Version	Date of Release	Authorisation:	Comments
4	14/10/2003	NTQC	**Summary of Modifications** 1 x Change of Qualification packaging rule 27 x Revision of Qualifications 4 x Replacement of competency standards 4 x Splitting of competency standards 6 x New Qualifications 91 x New competency standards 3 x Newly imported competency standards **Modification Details** ***Change of Qualification packaging rule*** (See Volume 1) • Changed packaging rules applicable to the compulsory stream AUR31499 (Sales – Vehicle) ***Revision of Qualifications*** (See Volume 1) • AUR23708A removed from compulsory stream of AUR20899 Cert II in Automotive (Mechanical – Cylinder head reconditioning) & AURT3813A & AURT3814A included in compulsory stream • AUR23608A removed from compulsory stream of AUR20999 Cert II in Automotive (Mechanical – Driveline) & AURT3810A & AURT3811A included in compulsory stream • AUR23608A removed from compulsory stream of AUR21099 Cert II in Automotive (Mechanical – Exhaust Fitting & Repair) & AURT3810A & AURT3811A included in compulsory stream • AUR04166A, AUR04170A & AUR23608A, removed from compulsory stream of AUR21199 Cert II in Automotive (Mechanical – Natural Gas Vehicle (NGV) Services) & ART2833A, AURT3810A, AURT3811A & AURT3835A included in compulsory stream • AUR23608A removed from compulsory stream of AUR21299 Cert II in Automotive (Mechanical – Radiator Repair) & AURT3810A & AURT3811A included in compulsory stream • AUR23608A removed from compulsory stream of AUR21399 Cert II in Automotive (Mechanical – Steering & Suspension) & AURT3810A & AURT3811A included in compulsory stream • AUR17966A removed from compulsory stream of AUR21499 Cert II (Mechanical – Tyre fitting & Repair Heavy) & AURT2800A, AURT2801A, AURT2802A, AURT2803A and AURT2804A to be chosen from for completion

MODIFICATION HISTORY – ENDORSED MATERIALS

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Version	Date of Release	Authorisation:	Comments
4	14/10/2003	NTQC	***Revision of Qualifications*** (continued) (See Volume 1) • AUR23608A & AUR24623A removed from compulsory stream of AUR22499 Cert II in Automotive (Vehicle Body – Accessory Fitting "Mechanical") & AURT2817A, AURT3810A and AURT3811A included in compulsory stream • AUR23608A removed from compulsory stream of AUR22699 Cert II in Automotive (Vehicle Body – Dismantling) & AURT3810A & AURT3811A included in compulsory stream • MEM8.7AA removed from compulsory stream of AUR22999 Certificate II in Automotive (Vehicle Body – Window Tinting) and AURV2800A included in compulsory stream • AUR23608A removed from compulsory stream of AUR30299 Cert III in Automotive (Mechanical – Automatic Transmission) & AURT3810A & AURT3811A included in compulsory stream • AUR23608A & AUR24623 removed from compulsory stream of AUR30399 Cert III in Automotive (Mechanical – Brakes) & AURT3810A & AURT3811A included in compulsory stream • AUR23708A removed from compulsory stream of AUR30499 Cert II in Automotive (Mechanical – Diesel Fitter) & AURT3813A & AURT3814A included in compulsory stream • AUR23608A removed from compulsory stream of AUR30699 Cert III in Automotive (Mechanical – Driveline) & AURT3810A & AURT3811A included in compulsory stream • AUR23608A removed from compulsory stream of AUR30799 Cert III in Automotive (Mechanical – Engine Reconditioning) & AURT3810A & AURT3811A included in compulsory stream • AUR23608A removed from compulsory stream of AUR30899 Cert III in Automotive (Mechanical – Heavy Vehicle Road Transport) & AURT3810A & AURT3811A included in compulsory stream • AUR23608A removed from compulsory stream of AUR30999 Cert III in Automotive (Mechanical – Heavy Vehicle Mobile Equipment) & AURT3810A & AURT3811A included in compulsory stream • AUR23608A removed from compulsory stream of AUR31199 Cert III in Automotive (Mechanical – Motorcycle) & AURT3810A & AURT3811A included in compulsory stream • AUR4131A, AUR4166A, AUR4170A & AUR23608A removed from compulsory stream of AUR31299 Cert III in Automotive (Mechanical – Natural Gas Vehicle Installer) & AURT2832A, AURT3810A, AURT3811A, AURT3831A & AURT3835A included in compulsory stream • AUR23708A removed from compulsory stream of AUR31599 Cert III in Automotive (Vehicle Body - Building) & AURT3813A & AURT3814A included in compulsory stream • AUR23708A removed from compulsory stream of AUR31699 Cert II in Automotive (Vehicle Body – Panel Beating) & AURT3813A & AURT3814A included in compulsory stream • AUR31108A removed from compulsory stream of AUR31799 Cert III Automotive (Vehicle Body – Trimming) & AURV3802A included in compulsory stream • AUR24623A removed from compulsory stream of AUR31999 Cert III in Bicycles (Mechanics) • AUR23708A removed from compulsory stream of AUR32199 Cert II in Marine (Installation) & AURT3813A & AURT3814A included in compulsory stream

MODIFICATION HISTORY – ENDORSED MATERIALS

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MODIFICATION HISTORY – ENDORSED MATERIALS

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MODIFICATION HISTORY – ENDORSED MATERIALS

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4	14/10/2003	NTQC	***New competency standards (***continued) (See Volume 4) • New unit AURT4502A Plan and manage compliance with environmental regulations and best practice in the mechanical repair industry • New unit AURT4770A Analyse and evaluate gas fuel system faults • New unit AURT5700A Analyse and evaluate light vehicle steering and suspension system faults • New unit AURT5701A Analyse and evaluate light vehicle driveline system faults • New unit AURT5702A Analyse and evaluate light vehicle engine and fuel system faults • New unit AURT5703A Analyse and evaluate light vehicle braking system faults • New unit AURT5710A Analyse and evaluate heavy vehicle steering and suspension system faults • New unit AURT5711A Analyse and evaluate heavy vehicle transmission system faults • New unit AURT5712A Analyse and evaluate heavy vehicle engine and fuel system faults • New unit AURT5713A Analyse and evaluate heavy vehicle braking system faults • New unit AURT5720A Analyse and evaluate wheeled mobile plant steering and suspension system faults • New unit AURT5721A Analyse and evaluate wheeled mobile plant transmission system faults • New unit AURT5722A Analyse and evaluate mobile plant engine and fuel system faults • New unit AURT5723A Analyse and evaluate tracked mobile plant transmission, steering and braking system faults • New unit AURT5724A Analyse and evaluate tracked mobile plant undercarriage and suspension system faults • New unit AURT5725A Analyse and evaluate wheeled mobile plant braking system faults • New unit AURT5726A Analyse and evaluate mobile plant hydraulic system faults • New unit AURT5730A Analyse and evaluate motorcycle steering, suspension and frame system faults • New unit AURT5731A Analyse and evaluate motorcycle engine and transmission system faults • New unit AURT5732A Analyse and evaluate motorcycle electrical/electronic system faults • New unit AURT5733A Analyse and evaluate motorcycle braking system faults • New unit AURT5735A Analyse and evaluate light marine hydraulic system faults • New unit AURT5736A Analyse and evaluate light marine transmission system faults • New unit AURT5737A Analyse and evaluate light marine engine and powerhead system faults • New unit AURT5738A Analyse and evaluate light marine hull performance and stability system faults • New unit AURT5740A Develop and apply mechanical systems modification • New unit AURT5741A Develop and apply hydraulic systems modification • New unit AURT5742A Develop and apply pneumatic systems modification

MODIFICATION HISTORY – ENDORSED MATERIALS

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3.00	15/04/2002	NTQC	• AUR18866A, AUR19066A & AUR 22670A removed from compulsory stream of AUR30899 Cert III in Automotive (Mechanical - Heavy Vehicle) & AUR17665A included in compulsory stream. • Typographical error in AUR04671A, now AUR04671B. • Change to qualification formula. • Other cat 1 changes - omission of words or content that do not necessarilly effect outcomes.
2.00	1/10/2001	NTQC	Introduction of Aftermarket Sector
1.00	13/09/1999	NTFC	Primary Release

Forms control: All endorsed training packages will have a version number displayed on the imprint page of every volume constituting that training package. Every training package will display an up-to-date copy of this modification history form, to be placed immediately after the contents page of the first volume of the training package. Comments on changes will only show sufficient detail to enable a user to identify the nature and location of the change. Changes to training packages will generally be batched at quarterly intervals. This modification history form will be included within any displayed sample of that training package and will constitute all detail available to identify change

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AURC2501A Apply environmental regulations and best practice in a workplace or business

Unit descriptor

This unit covers the competency to identify and apply environmental regulations and avoid potential hazards in a workplace or business.

ELEMENT	PERFORMANCE CRITERIA
1. Apply relevant environment regulations	1.1 Reasons for ethical environmental practice in a workplace or business are identified
	1.2 Environmental responsibilities of employees in a workplace or business are identified
	1.3 Penalties for individual breaches of the legislation are identified
	1.4 Waste is minimised, waste materials including solids, sludge and biological material are sorted and stored in appropriate bins for recycling or disposal
	1.5 Packaging on goods received is sorted and disposed of appropriately
2. Identify and avoid hazards to stormwater	2.1 No waste water or contaminants are allowed to enter the stormwater system
	2.2 All parts and components containing environmentally hazardous material are stored undercover in a sealed and bunded or drained treatment area
	2.3 All liquid wastes are drained into appropriate storage or recycling containers
	2.4 Spill kit is located and used as needed to prevent stormwater contamination
	2.5 Spills are cleaned immediately and the workplace is kept clean to prevent unintentional stormwater pollution
3. Identify and avoid hazards to air quality	3.1 Hazards of air borne particles are identified, minimised and contained
	3.2 Hazards gases and fumes are identified, minimised and contained
4. Identify and avoid noise hazards	4.1 Noise creating activities are minimised and carried out within approved operating hours

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Automotive business	• Any automotive business excluding body repair, marine and mechanical involving the removal of components containing oils or other fluids
Unit scope	• Work involves the normal activities of an automotive business including the occupations of glazing, accessory fitting, window tinting, trimming and bicycles This unit is applicable to Certificate II qualifications. Other specific environmental competency standards apply to marine, paint and panel preparation and some mechanical stream qualifications involving the removal of components containing oils or other fluids
Unit context	• OH&S requirements, material safety data sheets, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in undertaking environmentally sound work practices • Competency may be demonstrated in any workplace or business excluding, body repair, marine, mechanical involving the removal of components containing oils or other fluids
Tools and equipment	• Tools and equipment are to include spill kits and recycling containers
Material	• Material safety data sheets
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Environmental legislation, regulations and advice
- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job cards/sheets
- Site environmental policy
- Workplace procedures relating to reporting and communication of environmental issues
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Apply safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Apply environmental regulations and best practice
- Identify material used in the business and assess their environmental impact
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output, product and service quality
- Conduct operator maintenance on tools and equipment to ensure environmental efficiency
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment
- Use of a spill kit

EVIDENCE GUIDE

Underpinning knowledge

- Relevant aspects of environmental legislation and its implications to work being undertaken
- Characteristics and potential environmental impact of products used in the business
- Philosophy of prevent, reuse, reduce, recycle
- Procedures for reporting machinery faults and material defects
- Internal reporting procedures for significant environmental damage occurring in the workplace

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to environmental procedures from legislation, regulations, policies, guidelines and workplace practices in a workplace or business. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable all work is undertaken in accordance with environmental best practice, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 1)
Plan and organise activities	Plan and organise activities including the preparation of equipment and material and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use planning, checking and inspection techniques to avoid environmental contamination and wastage. (Level 1)
Use technology	Use the workplace technology related to environmental protection equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to an automotive business excluding, body repair, marine, mechanical involving the removal of components containing oils or other fluids

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, materials, work instructions and deadlines

AURC1501A Identify environmental regulations and best practice in a workplace or business

Unit descriptor

This unit covers the competency to identify environmental regulations and avoid potential hazards in an automotive workplace.

ELEMENT	PERFORMANCE CRITERIA
1. Identify relevant environment regulations	1.1 Reasons for ethical environmental practice in an automotive workshop are identified
	1.2 Responsibilities of employees in an automotive workshop are identified
	1.3 Penalties for individual breaches of the legislation are identified
	1.4 Methods to minimise waste and sort store for recycling or disposal are identified
	1.5 Methods to sort and dispose of packaging on goods received are identified
2. Identify hazards to stormwater	2.1 Actions to be taken to ensure no waste water is allowed to enter the stormwater system are identified
	2.2 Storage methods for parts and components containing environmentally hazardous material are identified
	2.3 Recycling and storage procedures for liquid wastes are identified
	2.4 Uses of a spill kit are identified
	2.5 Procedures to keep workplace clean and prevent unintentional stormwater pollution are identified
3. Identify hazards to air quality	3.1 Hazards of airborne particles are identified, and methods to minimise and contain are identified
	3.2 Hazards of gases and fumes are identified, and methods to minimise and contain are identified
4. Identify noise hazards	4.1 Effects of noise creating activities and methods to minimise these are identified

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Automotive business	• This competency can be obtained in an institutional setting
Unit scope	• Work involves the theory and knowledge related to environmental issues in the automotive industry
Unit context	• OH&S requirements, material safety data sheets, hazardous substances and dangerous goods code and safe operating procedures • Competency is demonstrated in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Competency requires individuals to demonstrate discretion, judgement and problem solving skills in undertaking environmentally sound work practices • Competency may be demonstrated in any appropriate setting and does not require practical demonstration
Tools and equipment	• No specific tools and equipment are required
Material	• Material safety data sheets
Personal protective equipment	• No specific personal protective equipment is required
Information and procedures	• Environmental legislation, regulations and advice. • Typical site environmental policy • Typical manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Demonstrate a knowledge of environmental regulations and best practice as they would apply in an automotive workplace or business
- Identify material used in an automotive business and assess their environmental impact

Underpinning knowledge

- Relevant aspects of environmental legislation and its implications for work being undertaken in an automotive business
- Characteristics and potential environmental impact of products used in the automotive industry
- Philosophy of prevention, reuse, reduce, recycle
- Procedures for use of spill kit
- Effects of noise pollution and methods to minimise it

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to environmental procedures from legislation, regulations and workshop practices in a workplace or business. (Level 1)
Communicate ideas and information	Communicate ideas and information to enable all work is undertaken in accordance with environmental best practice, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation of equipment and material and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 1)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)
Solve problems	Use planning, checking and inspection techniques to avoid environmental contamination and wastage. (Level 1)
Use technology	Use workplace technology related to environmental protection equipment. (Level 1)

EVIDENCE GUIDE

Resource implications	• Access to environmental legislation, regulations and best practice models
Method of assessment	• Assessment should be by questioning on underpinning knowledge • Assessment could be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in an institutional setting

AURC4501A Plan and manage compliance with environmental regulations and best practice in a workplace or business

Unit Descriptor

This unit covers the competency to plan and implement an appropriate management system that ensures the protection of the environment in a workplace or business.

ELEMENT	PERFORMANCE CRITERIA
1. Plan and manage compliance with relevant environment regulations	1.1 Reasons for ethical environmental practice in a workplace or business are identified
	1.2 Environmental responsibilities of employers and employees in an automotive workplace or business are identified
	1.3 Penalties for company and individual breaches of the legislation are identified
	1.4 Waste products are minimised and facilities provided for waste material to be stored in appropriate bins for recycling or disposal
	1.5 Collection and recycling arrangements are implemented for liquids, sludge, solids and other waste
	1.6 Suppliers with minimal excess packaging on goods received are sourced. Packaging on goods received is sorted and disposed of appropriately
	1.7 Waste and energy conservation strategies are identified and implemented
2. Manage potential hazards to stormwater systems to avoid contamination	2.1 Systems are in place to ensure waste water does not enter the stormwater system
	2.2 All drains and flows are identified on a site map directly indicating where they flow
	2.3 Appropriate trade waste permits are in place
	2.4 Undercover and bunded or drained areas are provided and used for the storage of all material containing environmentally hazardous substances
	2.5 Spill kit is provided and used as needed to prevent stormwater contamination by staff trained in its use
	2.6 Workplace is kept clean to prevent unintentional stormwater pollution

ELEMENT	PERFORMANCE CRITERIA
3. Manage potential hazards to air quality to avoid contamination	3.1 Hazards of air borne particles are identified, minimised and contained
	3.2 Hazards of gases and fumes are identified, minimised and contained
	3.3 A well ventilated area is provided for any welding activities where appropriate
4. Minimisation of noise hazards is planned and managed	4.1 Noise creating activities are minimised and carried out within approved operating hours
	4.2 Fixed machinery is fitted with silencers or surrounded by noise containment material
5. Management systems	5.1 An environmental policy and contingency plan suitable to the needs of the business is developed and implemented
	5.2 Waste to landfill is calculated and possible savings through reuse and recycling are calculated
	5.3 Payback period on environmental equipment is calculated
	5.4 Manage staff adherence to environmental responsibilities
	5.5 Environmental records are accurately and legibly maintained and stored securely in a form accessible for reporting procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Automotive Business

- Any automotive business excluding body repair, marine and mechanical involving the removal of components containing oils or other fluid

Unit Scope

- Work involves the normal activities of an automotive business including the planning and management of the occupations of glazing, accessory fitting, window tinting, trimming, and bicycles
- This unit is applicable to qualifications at both the Certificate IV and V level. In marine, body and some mechanical areas involving the removal of components containing oils or other fluids. Specific environmental competency standards should be used in these areas

RANGE STATEMENT

Unit Context	• OH&S requirements, material safety data sheets, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, and manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills to improve environmental performance by reducing environmental risk and waste • Competency may be demonstrated in any automotive business excluding, body repair, marine, mechanical involving the removal of components containing oils or other fluids
Tools and Equipment	• Tools and equipment are to include spill kits, recycling bins and drums • Tools and equipment may include a containment area for hazardous substances
Material	• Material safety data sheets, environmental records, manufacturer/component supplier specifications, costings of equipment and waste removal • May also include staff environmental induction material
Personal Protective Equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and Procedures	• Environmental legislation, regulations and advice • Workplace procedures relating to the use of tools and equipment • Work instructions and procedures • Site environmental policy • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and operational procedures • Local council and waterways regulations

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical Aspects of Evidence

- Plan and manage safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Plan and mange environmental protection procedures in the business
- Identify material used in process in the business and assess and manage their environmental impact
- Plan and manage work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - maintain a clean workplace
  - prevent damage and wastage of goods, equipment and products
  - dispose of waste in accordance with legislative requirements and best practice
  - maintain required production output, product and service quality
- Report significant environmental damage or spills plan and manage operator maintenance on equipment to ensure environmental efficiency
- Manage effective planning and team work related to environmental best practice
- Develop/implement or audit an existing business environmental policy which covers at a minimum; waste, recycling, hazards to stormwater, air quality, noise, energy minimisation and costs
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning Knowledge

- Relevant aspects of environmental legislation and its relationship with OH&S, financial and risk management
- Requirements for trade waste permits
- Spill clean up procedures
- Characteristics and potential environmental impact of products used in the business
- Philosophy of sustainability through prevention, reuse, reduce, recycle
- Procedures for rectifying machinery faults and material defects
- Actions to be taken in case of significant environmental threat in the workplace
- Reporting procedures for significant environmental damage occurring in the workplace
- Cleaner production and eco-efficient strategies to avoid the production of waste

Underpinning Skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, Analyse and Organise Information	Collect, organise and understand information related to environmental procedures from legislation, regulations, policies, guidelines, standards and workplace best practices in an automotive business. (Level 3)
Communicate Ideas and Information	Communicate ideas and information to enable all work undertaken is in accordance with environmental best practice. Support from stakeholders is actively sought for implementing suitable innovation and continuous improvement. (Level 3)

EVIDENCE GUIDE

Underpinning Skills (continued)

Plan and Organise Activities	Plan and organise activities including the preparation of equipment and material recycling and waste management systems and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 3)
Work with Others and in a Team	Promote work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)
Use Mathematical Ideas and Techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements and calculate wastage rates of various methods. (Level 3)
Solve Problems	Use planning, checking and inspection techniques to avoid environmental contamination and wastage. (Level 3)
Use Technology	Use the workplace technology related to environmental protection and recycling equipment. (Level 2)

EVIDENCE GUIDE

Resource Implications

- Access to an automotive business which includes waste material of various types, recycling bins, liquid, sludge and solid wastes

  Resources may include pressure washing and facilities for the use of recycled water

EVIDENCE GUIDE

Method of Assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a component authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of Assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURCR20900A Contribute to quality work outcomes

Unit descriptor

This unit covers the competency for individual involvement in the achievement of quality work outcomes and environmental compliance throughout Aftermarket work activities.

Element	Performance Criteria
1. Plan and prepare for quality work outcomes	1.1 Relevant quality procedures are identified from site/enterprise and team quality requirements. 1.2 Performance indicators for individual work are identified and agreed with the appropriate persons. 1.3 Work plans and processes which facilitate the achievement of quality work outcomes are adopted.
2. Comply with environmental requirements	2.1 Environmental requirements for the work are interpreted and considered as a factor in work planning/preparation. 2.2 Environmental monitoring and control procedures are implemented during the work processes. 2.3 Environmental incidents and potential problems are identified and responded to or referred to others in accordance with site requirements.
3. Achieve and maintain quality work outcomes	3.1 Responsibility for monitoring quality of outputs is accepted and changes implemented by the individual, as necessary, in accordance with site procedures. 3.2 Performance indicators are monitored, adjusted and agreed to meet changing circumstances and satisfied. 3.3 Loss and damage incidents are minimised by monitoring work processes, reporting incidents and applying local risk control processes. 3.4 Procedural improvements and/or recommendations are communicated to the relevant people.

Range of Variables

Quality procedures

May be contained in site quality system documentation, work instructions, safe work procedures, product specifications, equipment maintenance schedules, technical procedures and adopted or specifically prepared standards.

Sources of information/documents
Vehicle manufacturer/component supplier specifications, enterprise operating procedures, supplier directories, parts catalogues, customer orders and industry/workplace codes of practice, material safety data sheets (MSDS) and hazchem.

Legislative requirements
This includes state and territory legislation related to OH&S and Australia Design Rules.

Performance indicators
Are to account for issues of time, quantity, quality and cost factors and may include establishing time targets for own work, identifying reasonable criteria for evaluating own work outcomes, identifying measures to avoid wastage, identifying reasonable criteria to judge internal and/or external customer satisfaction and identifying processes to ensure a 'right first time' approach.

Environmental requirements
Are those established under law and by the enterprise and coverage may include dust, water quality, waste water management, chemicals handling, noise/vibration, fuel/oil handling and disposal, waste management and rehabilitation.

Environmental control measures
May include chemical management, dust suppression, water treatment, waste water processes, application of materials, compliance with noise/vibration standards and application of waste disposal procedures.

Environmental reports and records
May include complaints register and incidental reporting procedures.

Resources
May include stationery, forms, business documents, job cards, internal memoranda, file notes.

Loss and damage incidents
May include personal injury, loss and damage of plant, equipment and material.

Communications
Communications may be verbal, written, by telephone or by other means.

Evidence Guide

Critical aspects
It is essential that competence in this unit signifies the ability to transfer the competency to changing circumstances and to respond to unusual circumstances in the critical aspects of:

- communicating effectively with others in associated areas
- identifying quality procedures and needs
- identifying individual performance indicators
- monitoring and adjusting performance indicators to meet changing circumstances
- satisfying performance indicators
- applying environmental control systems
- processing recommendations for change.

Interdependent assessment of units
This unit may be assessed in conjunction with other common or technical units which form part of a work role.

Underpinning knowledge
- General knowledge of quality systems in a workplace.
- General knowledge of typical loss and damage control systems.
- General knowledge of environmental legislative framework and environmental licence provisions.
- General knowledge of work planning processes.
- Working knowledge of OH&S requirements, equipment, material and personal safety requirements processes at the worksite.
- Working knowledge of enterprise quality systems and processes.
- Working knowledge of site environmental procedures and key constraints.
- Working knowledge of site environment control measures.

Underpinning skills
- Research and interpretative skills to locate, interpret and apply relevant operational quality and environmental information.
- Questioning and active listening skills, for example when obtaining information of quality and environmental working practices.
- Plain English literacy and communication skills in relation to dealing with others involved in the work.
- Technical literacy and communication skills sufficient to interpret and apply common industry terminology, and interpret symbols used for quality and environmental signage.
- Basic problem solving skills to assess quality and environmental issues.

Consistency in performance
It is preferable that assessment reflects a process rather than an event and that it occurs over a period of time to cover the varying work process circumstances. Evidence of performance may be provided by customers, team leaders/members or other appropriate persons subject to agreed authentication arrangements.

Context for assessment
Assessment of this unit must be completed on-the-job or in a realistically simulated work environment which reflects a range of quality processes and procedures.

Resource implications
The following are required:
- a workplace or simulated workplace
- realistic situations requiring quality and environmental working practices
- site or equivalent instructions on quality and environmental working practices
- hazardous chemicals information (and/or dangerous goods if applicable)
- appropriate material, tools and equipment.

Key Competencies and Application to Standards

	Level 1	Level 2	Level 3
Collecting, analysing and organising information	•		
Communicating ideas and information	•		
Planning and organising activities	•		
Working with others in teams	•		
Using mathematical ideas and techniques	•		
Solving problems	•		
Using technology	•		

AURCR20051A Work effectively with others

Unit descriptor

This unit covers the competency to organise self, to perform tasks, to behave responsibly and to work effectively as a member of a work group or team.

Element	Performance Criteria
1. Contribute to the determination of appropriate work roles	1.1 Work roles for each group or team member are identified based on information and instructions about objectives, performance requirements and procedures. 1.2 Contributions are made to assist in the determination of the appropriate roles and responsibilities for the successful completion of work activities.
2. Contribute to the planning of activities	2.1 Suggestions and information are provided as appropriate to contribute to the planning of work activities and associated procedures.
3. Organise and accept responsibility for own workload	3.1 Priorities and deadlines are established in consultation with others (as appropriate) and documented. 3.2 Work activities are planned and progress of work is communicated to others whose personal work plans and timelines may be affected. 3.3 Work is completed to the standard expected in the workplace and in accordance with any guidelines, directions and instructions. 3.4 Variations and difficulties affecting work requirements are identified through regular reviews and action is taken to report these issues to appropriate personnel. 3.5 Additional support to improve work is communicated clearly to appropriate personnel.
4. Maintain enterprise dress and grooming standards	4.1 Enterprise and/or industry dress standards and requirements are maintained. 4.2 Enterprise and/or industry grooming standards are maintained.
5. Work with others	5.1 Forms of communication appropriate to the work activities are used. 5.2 Assistance in the completion of the activities is requested where appropriate. 5.3 Support is provided to colleagues to ensure designated team goals are achieved.

Element		Performance Criteria	
5.	Work with others (continued)	5.4	Contributions to the achievement of a required outcome are made.
		5.5	Work is undertaken in accordance with specified procedures on an individual and shared basis as appropriate.
		5.6	Problems are discussed and resolved where possible through agreed and accepted processes.
		5.7	Suggestions for improvements to process are made and discussed within the team.
6.	Participate in identifying and meeting own development needs	6.1	The competencies for the workplace are identified.
		6.2	Organisational structure, career paths and development opportunities appropriate to the workplace are identified.
		6.3	Steps are taken, in consultation with appropriate personnel, to identify own learning needs through assessment and planning for future work requirements.
		6.4	Appropriate opportunities to learn and develop required competencies are undertaken including establishing networks and working relationships with others.
7.	Work effectively and responsibly	7.1	Notification of shift/work availability or non-attendance for shift/work is given without undue delay and according to enterprise policies and procedures.
		7.2	Staff rosters are interpreted accurately.
		7.3	Non-discriminatory attitudes are displayed when interacting with customers, staff and management.
		7.4	Non-discriminatory language is used consistently.
		7.5	Relevant awards/enterprise agreements are identified and interpreted accurately.

Range of Variables

Enterprise

Enterprises may vary in size, type and location, in the range of work activities conducted, hours of operation and in the number and type of staff.

Sources of information

These may include enterprise policies and procedures relating to organisational structure, work roles and responsibilities, career paths, work standards, dress and grooming standards, work objectives and performance requirements.

Legislative requirements
This may include legislation or regulations in relation to OH&S, equal opportunity, anti-discrimination, consumer law, trade practices and fair trading and industrial relations.

This may also include industry codes of practice.

Awards/Agreements
These may include relevant State and Federal industry awards and enterprise or workplace agreements.

Customers
Customers may be regular or new, internal or external, and may include people from a range of social, cultural or ethnic backgrounds and physical and mental abilities.

Staff
Staff may be full-time, part-time or casual and vary in terms of staff training and in staffing levels, eg. staff shortages. Staff may be operating in routine or busy trading and may include people from a range of social, cultural or ethnic backgrounds and physical and mental abilities.

Staff may work in teams or groups of varying size and structure.

Communication
Communication may include face to face, telephone, written or electronic means.

Activities
Activities may include normal or routine work requirements or additional/non-routine work requirements.

Evidence Guide

Critical aspects
It is essential that competence in this unit signifies the ability to transfer the competency to changing circumstances and to respond to unusual circumstances in the critical aspects of:

- organising and accepting responsibility for own workload
- following the designated work plan for the job
- contributing to collective planning, cooperative work and effective outcomes
- cooperating with others to complete work-oriented activities
- participating in identifying and meeting own development needs
- consistently applying enterprise and/or industry standards of dress and grooming
- consistently and responsibly applying enterprise policies and procedures in regard to workplace ethics, including interpretation of staff rosters, notification of availability for work and allocated duties/job description
- consistently applying enterprise policies and procedures and legislative requirements in regard to non-discriminatory language and attitudes
- knowing own rights and responsibilities in regard to awards/enterprise agreements.

Interdependent assessment of units
This unit may be assessed in conjunction with other units that form part of the job role or function.

Underpinning knowledge

- General knowledge of enterprise work procedures.
- General knowledge of group dynamics and the impact of working effectively with others on individual and group performance.
- General knowledge of enterprise work systems, equipment, management and facility operating systems.
- Operational knowledge of enterprise policies and procedures and legislative requirements in regard to:
  - workplace ethics
  - work availability or non-attendance
  - staff rosters
  - dress and grooming
  - discriminatory behaviour
  - harassment
  - equal opportunity
  - staff counselling and disciplinary procedures.
- Operational knowledge of relevant industry awards or enterprise/workplace agreements.
- Underpinning Skills Plain English literacy and communication skills in relation to reading and understanding workplace documents.
- Basic analytical, problem solving, negotiation and conflict management skills in relation to working with others.

Consistency in performance

It is preferable that assessment reflect a process rather than an event and that it occurs over a period of time to cover the varying circumstances. Evidence of performance may be provided by clients, team leaders/members or other appropriate persons subject to agreed authentication arrangements.

Context for assessment

The elements of competency contain both knowledge and practical components. The knowledge components may be assessed off the job. The practical components should be assessed on the job or in a realistically simulated work environment.

Evidence is best gathered using the products, processes and procedures of the individual workplace context as the means by which the candidate achieves industry competencies.

Resource implications

The following are required:

- a workplace or simulated workplace
- relevant documentation, such as enterprise or sample policies and procedures manuals related to ethics, employee and employer rights and responsibilities, dress and grooming, discrimination, job descriptions and organisation charts
- relevant legislation such as equal employment opportunity, equal opportunity and anti-discrimination
- enterprise or sample awards and/or enterprise/workplace agreements
- a qualified workplace assessor.

Key Competencies and Application to Standards

	Level 1	2	3
Collecting, analysing and organising information	•		
Communicating ideas and information	•		
Planning and organising activities	•		
Working with others in teams	•		
Using mathematical ideas and techniques	•		
Solving problems	•		
Using technology	•		

AURCT20200A Operate information technology systems

Unit descriptor

This unit covers the competency to the use and application of enterprise information technology systems. It requires knowledge of the hardware and software in use, and the ability to enter, retrieve and use information.

Element	Performance Criteria
1. Use enterprise information technology system	1.1 Knowledge of the enterprise information technology system(s) is accurately demonstrated and conveyed to other staff members. 1.2 Hardware is accurately identified and operated according to manufacturer/component supplier specifications and enterprise procedures. 1.3 Software, including databases, menus and Electronic Data Interchange (EDI), is accurately identified and used according to manufacturer/component supplier specifications and enterprise procedures. 1.4 Application and uses of software available is accurately identified and used according to enterprise procedures. 1.5 Data is transmitted according to EDI procedures. 1.6 Keyboard skills are used accurately to enter information by enterprise policies. 1.7 Back up procedures are regularly performed according to enterprise procedures.
2. Edit/update information	2.1 Information to be edited/updated is correctly identified according to enterprise procedures. 2.2 Information on system is accurately edited/updated according to enterprise procedures.
3. Solve problems	3.1 Equipment/hardware/software faults are identified and rectified where possible or expert assistance sought without delay. 3.2 Maintenance program for hardware and software systems are monitored and implemented according to manufacturer/component supplier specifications and enterprise procedures. 3.3 Routine problems are handled using appropriate problem solving techniques and referred to appropriate personnel. 3.4 Assistance is positively and actively provided to staff as problems arise.

Range of Variables

Enterprise
Enterprises may vary in size, type and location and in their range of products and services.

Information technology systems
Systems used may be centrally based, location based or networked. Systems may be loaded/downloaded electronically or manually. Communications may be by network or by the internet.

Types of software may include menus, databases or EDI.

Equipment
This may include a range of personal computers and computer terminals, which may be stand alone or networked.
Information technology equipment may also include scanning equipment, bar coding equipment, point of sale terminals and pricing equipment.

System problems
These may relate to hardware faults, breakdowns, software faults or staff abilities/training. Problems may be solved by routine procedures, manufacturer/component supplier recommendations, lateral thinking or referral to a specialist/expert.

Sources of information
These may include enterprise policies and procedures in regard to information technology systems.
These may also include OH&S requirements, particularly in regard to use of screen based equipment, and may also include industry codes of practice.

Staff
Staff may be full-time, part-time or casual and vary in terms of staff training, in staffing levels, eg. staff shortages and in the range of responsibilities for information technology systems. Staff may be operating in routine or busy trading conditions.

Information
Information to be entered may include staffing information, customer details/records including names, addresses and profiles, stock records, stock transfers, orders, delivery details.

Evidence Guide

Critical aspects
It is essential that competence in this unit signifies the ability to transfer the competency to changing circumstances and to respond to unusual circumstances in the critical aspects of:

- consistently applying enterprise policies and procedures in regard to information technology systems, including resolution of systems faults and accessing/entering information on the enterprise systems
- following requirements of relevant legislation requirements.

Interdependent assessment of units
This unit may be assessed in conjunction with other units that form part of the job role or function.

Underpinning knowledge

- Operational knowledge of enterprise policies and procedures in regard to use of enterprise information technology systems, including:
  - use and maintenance of hardware and software systems
  - solutions to problems/breakdowns
  - operation of equipment.
- Operational knowledge of relevant legislation requirements for OH&S, including use of screen-based equipment.

Underpinning skills

- Plain English literacy skills in regard to interpreting documentation and completing reports or documents.
- Problem solving skills related to hardware and software problems.
- Technical skills in the operation of enterprise information technology hardware and software and the use, application and operation of relevant databases, menus and EDI.

Consistency in performance

It is preferable that assessment reflect a process rather than an event and that it occurs over a period of time to cover the varying circumstances. Evidence of performance may be provided by customers, team leaders/members or other appropriate persons subject to agreed authentication arrangements.

Context for assessment

The elements of competency contain both knowledge and practical components. The knowledge components may be assessed off the job. The practical components should be assessed on the job or in a realistically simulated work environment.

- Evidence is best gathered using the products, processes and procedures of the individual workplace context as the means by which the candidate achieves industry competencies.

Resource implications

The following are required:

- a workplace or simulated workplace
- relevant documentation, such as enterprise policies and procedures manuals relating to information technology systems, legislation requirements, industry codes of practice, hardware and software manuals
- information technology systems
- a qualified workplace assessor.

Key Competencies and Application to Standards

	Level 1	Level 2	Level 3
Collecting, analysing and organising information		•	
Communicating ideas and information		•	
Planning and organising activities		•	
Working with others in teams		•	
Using mathematical ideas and techniques		•	
Solving Problems		•	
Using technology		•	

AURT2832A Service gas fuel systems (LPG)

Unit descriptor

This unit covers the competency to service LPG fuel systems including systems/component inspection appropriate to vehicle periodical service requirements.

Systems Definition: Liquefied Petroleum Gas (LPG)

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment quantities and service manuals
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
2. Service Liquid Petroleum Gas (LPG) fuel systems	2.1 Liquid Petroleum Gas (LPG) fuel systems service is completed without causing damage to any component system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specification
	2.3 LPG fuel system service is carried out in accordance with vehicle/system manufacturer/component supplier current specifications for methods, equipment used and tolerances relative to the vehicle/system
	2.4 Appropriate workplace documentation is completed and dealt with relevant to installation outcomes
	2.5 Service activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

LPG fuelled vehicles	• The servicing of Liquefied Petroleum Gas (LPG) fuel systems to light, heavy vehicles, vessels, outdoor power equipment and forklift trucks
Unit scope	• Work involves measuring, visual inspection, assembling, testing. Methods should be applied under normal operating conditions
Unit context	• OH&S requirements include, Australian Standards, safety management systems, hazardous substances and dangerous goods code, safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in servicing of LPG fuel systems • Competency may be demonstrated in workplaces involved in the servicing of LPG fuel systems
Tools and equipment	• Tools and equipment are to include exhaust gas analyser, pressure/vacuum gauge, multimeter, leak detector and may include, but not be limited to hand tools
Material	• Material are to include replacement components, LPG and cleaning material
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices, footwear, clothing and gloves
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets, material safety data sheets and service manuals • Workplace procedures relating to reporting and communication including maintaining customer records • Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret job sheets, material safety data sheets and service manuals to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain LPG servicing and cleaning equipment
- Conduct operator maintenance on service equipment and hand tools
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Principles of operating of gas fuel systems
  - Servicing procedures
  - Equipment/material safety requirements
  - Personal safety procedures
  - Legislation where applicable
  - Industry codes of practice
  - Australian Standards – AS1425, AS2739, AS2746
  - Planning correct processes and techniques for servicing of LPG fuel vehicles/components

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Workplace guidelines regarding Australian Standards
- Workplace safety policies and procedures
- Procedures for reporting equipment faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to LPG service and replacement procedures, work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 1)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Use pre-checking and inspection techniques to anticipate planning and cleaning problems, avoid reworking and avoid wastage.
	(Level 1)
Use technology	Use the workplace technology related to LPG vehicle servicing including tools and equipment.
	(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to LPG fuel supplied vehicles and or components as identified in the Range Statement, standard operating procedures

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and may include electronic, verbal, written or questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM2400A Operate in a motorsport environment

Unit descriptor

This unit covers the competency to operate in a motorsport environment. It includes determining a career path, meeting motorsport team expectations and employment requirements, managing daily work activities and contributing to the effective working of the team.

ELEMENT	PERFORMANCE CRITERIA
1. Determine potential career path and develop individual goals	1.1 OH&S requirements including personal protection needs are observed throughout the work
	1.2 Structure of the motorsport sector (including the roles and functions of industry/association bodies) is identified
	1.3 Personal skills are assessed to identify strengths and weaknesses
	1.4 Motorsport team expectations are researched
	1.5 Personal expectations are identified and goals determined
	1.6 Potential career paths in motorsport are researched and matched with personal goals
	1.7 Training needs are identified and incorporated into career planning
2. Meet motorsport team employment requirements	2.1 Team organisational structure and team member roles and responsibilities are identified
	2.2 Obligations to employers and others, including confidentiality requirements are complied with
	2.3 Team lines of communication and authority are identified and complied with
	2.4 Work practices comply with relevant legislation, regulations, codes of practice and team expectations, policies and procedures
	2.5 Principles and methods of gaining and maintaining health and fitness levels appropriate to job role are identified and demonstrated
3. Manage daily work activities	3.1 Own work role and responsibilities are identified and complied with
	3.2 Lines of communication with supervisors, peers and external personnel are identified and utilised

ELEMENT	PERFORMANCE CRITERIA
3. Manage daily work activities (continued)	3.3 Individual tasks are identified, prioritised and completed within designated timeframes and team standards according to work schedule
	3.4 Assistance is sought from appropriate personnel when difficulties arise in achieving allocated tasks
	3.5 Changes are made to workload or work priorities where unforeseen circumstances or developments occur
	3.6 Own work is monitored and adjusted according to feedback obtained from supervisors and comparison with established team and workplace standards
	3.7 Personal workspace is kept in a well-organised and safe condition in accordance with team and workplace standards
	3.8 Potentially discriminatory and hazardous practices and policies are identified and reported to appropriate team personnel
4. Contribute to a productive team environment	4.1 Information and knowledge relevant to work is shared with team members to ensure designated work goals are met
	4.2 Personal work objectives are identified and prioritised in accordance with team requirements
	4.3 Constructive feedback received from other team personnel is encouraged, acknowledged and acted upon
	4.4 Variations in the quality of components and/or work practices from team standards are detected and reported to appropriate team personnel in accordance with team procedures
	4.5 Assistance is actively sought from or provided to other personnel when difficulties arise
	4.6 Communication techniques are used to gather and understand relevant instructions
	4.7 Signs of potential interpersonal conflict are identified, constructively acted upon and/or referred to a supervisor where appropriate

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work involved includes determining a career path, meeting motorsport team expectations and employment requirements, managing daily work activities and contributing to the effective working of the team
- Motorsport teams include national and international teams in any category. Categories in motorsport include but are not limited to car/truck, motorcycle, go-kart, boat, off-road and drag racing sectors (e.g. V8 Supercar, Formula 1, Formula Ford, Superbike, Sprintcars, jet-sprint boat and off-shore power boat categories

Unit context

- OH&S requirements including safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem-solving skills in managing own work activities and contributing to a productive team environment
- Competency may be demonstrated in a motorsport team environment, simulated workplace environment or workplaces involved in motorsport or motorsport team support

RANGE STATEMENT

Team expectations

- Team expectations include standards of:
  - dress, personal presentation, preparedness and personal conduct (including respect for the rights and responsibilities of others)
  - quality and timeliness of work and the role of excellence and innovation
  - knowledge of tools and equipment and specific work area functions
  - commitment, responsibility and preparedness for work, including working flexible hours to meet deadlines
  - confidentiality and ethical work practices
  - contribution to the overall effectiveness of the team

Australian and international motorsport regulatory bodies

- Australian and international motorsport regulatory bodies include bodies such as Fédération Internationale De L'Automobile (FIA), Confederation of Australian Motorsport (CAMS), Australian National Drag Racing Association (ANDRA), Australian Rally Commission (ARCom), Motorcycling Australia

Tools and equipment

- Tools and equipment may include pneumatic impact wrench (rattle gun), boom, gas bottle, fire extinguisher types, car stands, spanner types, wheel nut types and hub components, suspension components, damper components, lifting devices (including jacks), front and rear bars/spoilers and anti-roll bars

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team policies and procedures relating to use of work areas, authorities and lines of communication
- Task instructions including worksheets, checklists and plans
- Team procedures relating to reporting and communication
- Team procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for material, tools and equipment
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Produce a career plan which covers:
  - personal goals and expectations
  - opportunities
  - timelines and personal development needs
- Correctly perform a range of daily work activities for a minimum duration of one (1) day on at least three (3) occasions in motorsport environments which cover:
  - routine maintenance
  - pre-event preparation
  - a competition event
  - post-event maintenance and repairs
- Work with and around other team members
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Motorsport categories
- Roles of Australian and international motorsport regulatory bodies
- Structure of the motorsport sector, roles within teams and their relationship with one another
- Authority and communication lines within teams
- Motorsport work ethic and team expectations, including personal attitudes needed
- Appropriate motorsport terminology used to assist work performance
- Performance vehicle components, and tools and equipment used by motorsport teams
- Workshop layout and organisation
- Principles and methods of gaining and maintaining health and fitness (including nutritional requirements)
- Goal setting methods and techniques
- Communication principles and techniques
- Conflict resolution principles and techniques

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to the motorsport sector including team roles and responsibilities, OH&S requirements, motorsport categories and potential career paths. (Level 1)
Communicate ideas and information	Communicate ideas and information to enable articulation of personal goals and career choices, and information to team members in the workplace. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including equipment and resources to avoid any backtracking, workflow interruptions or wastage. (Level 1)
Work with others and in a team	Work with others and in a team using cooperative approaches to optimise work practices and contribute to a productive team environment. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to interpret work instructions and complete specified tasks. (Level 1)
Solve problems	Use problem solving techniques to develop solutions to unpredicted situations, clarify work instructions where necessary, and resolve conflict. (Level 1)
Use technology	Use the workplace technology related to measurement including tools, equipment, calculators and measuring devices. (Level 1)

EVIDENCE GUIDE

Resource implications

- Access to motorsport team policies and procedures related to job descriptions, authority and communication lines as identified in the Range Statement
- Tools and equipment as identified in the Range Statement and a realistic work environment

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace-relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Context of assessment

- Assessment may occur on the job or in a workplace-simulated facility with relevant competition vehicle components, tools and equipment
- Assessment of this competency may include project-related tasks and require portfolios or other forms of indirect evidence of process

AURM2401A Set up and dismantle temporary work location and equipment

Unit descriptor

This unit covers the competency to set up temporary work location and equipment as per specified team requirements. It includes setting up and dismantling temporary shelter and equipment storage, layout of equipment, erecting team/promotional signage and setting up functional workspace.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare site	1.1 Site information is interpreted and requirements confirmed with site supervisor/circuit manager
	1.2 Security and confidentiality issues are considered and appropriate risk management measures selected
	1.3 Potential hazards are identified and appropriate risk management measures selected
	1.4 Path of movement (obstacles, hazards and safety conditions) is considered in positioning of equipment and tools and appropriate measures taken to eliminate hazards
	1.5 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
2. Assemble temporary work location	2.1 Equipment and tools are unloaded from transporter in accordance with team requirements
	2.2 Temporary work shelter and associated fittings are assembled, erected and secured in accordance with shelter manufacturer/component supplier procedure, team requirements and event supplementary regulations
3. Position equipment and tools	3.1 Equipment is assembled as per manufacturer/component supplier specifications
	3.2 Equipment is positioned as per team requirements, OH&S requirements, controlling body rules, category rules and supplementary regulations
	3.3 Required protective equipment is identified and fitted/installed in accordance with manufacturer/ component supplier and team guidelines
	3.4 Effectiveness of area layout is monitored during use and recommendations for changes are made to appropriate persons
	3.5 Problems with the work area are identified and reported to appropriate persons

ELEMENT	PERFORMANCE CRITERIA
4. Dismantle temporary work location	4.1 Temporary work shelter is cleaned, dismantled and packed in preparation for transportation in accordance with team procedures
	4.2 Tools and equipment are accounted for, maintained and packed in preparation for transportation in accordance with team procedures
	4.3 Shelter, equipment and tools are loaded on transporter in accordance with team procedures
	4.4 Work area is cleaned and inspected for serviceable condition in accordance with local requirements

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves setting up temporary work location and equipment as per specified team requirements. It includes setting up and dismantling temporary shelter and equipment storage, layout of equipment, erecting team/promotional signage and setting up functional workspace
- Ancillary set-up may include erection of temporary wheel alignment and weighing equipment, installation of pit wall resources (eg data acquisition beacon, pit board, stop watches, links and cabling)
- Setting up a temporary work site may involve installation of floor matting, set-up of tables and benches, and positioning of all tools and equipment (including category specific resources such as nitrogen bottles, tyre warmers, power leads, jacking systems), installation of computing and data acquisition equipment, installation of firefighting and environmental protection equipment (e.g. drip/spill trays, oil absorbent material, cleaning agents and disposal containers), erection of promotional signage and security barriers
- Temporary work locations may include specified pit areas (pit lane and pit bay) and service areas for rally and boating events

RANGE STATEMENT

Unit context	• OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures • Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in the site preparation and assembly and disassembly of temporary work site • Competency may be demonstrated at an event site or in a simulated environment
Tools and equipment	• Tools and equipment may include, but are not limited to lifting devices and basic construction tools such as hammers, pliers, zip ties, tape, step-ladder, spanners, screwdrivers etc
Materials	• Materials may include light gauge tubing, synthetic panelling, wire, rope and cord etc
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and team policies and practices
Information and procedures	• Controlling body rules, category rules and supplementary regulations • Team/enterprise procedures relating to setting up a temporary work location • Task instructions including work sheets, check lists, plans, drawings and designs • Team/enterprise procedures relating to reporting and communication • Team/enterprise procedures relating to the use of tools and equipment • Manufacturer/component supplier specifications and application procedures for testing equipment and materials • Australian Design Rules and/or appropriate building codes (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly set up and dismantle a temporary work location on a minimum of three (3) occasions (in at least two (2) different locations) and complete the following:
  - identify/confirm temporary location layout
  - establish the area layout
  - confirm effectiveness of area layout
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Event category rules, supplementary regulations, site and team requirements
- Principles and functionality requirements of the layout of temporary work location
- Workflow of pit lane/service area operations
- Tools and equipment required for specific events
- Temporary shelter assembly and erection methods and techniques
- Positioning of equipment for ease of access, security, logical workflow and ergonomic use

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Set-up of equipment for safe and effective operation (e.g. correct boom height, securing of gas bottles, secure service area moorings/pontoon etc.)
- OH&S principles relating to loading and unloading equipment and shelter erection.

Underpinning skills

These include a number of processes learnt throughout work and life and required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to set up and dismantling of temporary work location structure and layout, setting up of equipment, event category rules and supplementary regulations. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable checking of temporary work location and stowage of tools of equipment in transporter. (Level 1)
Plan and organise activities	Plan and organise activities to set up and dismantle site under limited supervision. (Level 1)
Work with others and in a team	Work with others and in a team by using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements relating to team operating area layout and equipment positioning. (Level 1)
Solve problems	Use checking and inspection techniques to ensure safety of temporary work location structure and equipment positioning. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology	Use the workplace technology related to lifting and measuring devices and equipment connections.

(Level 1)

EVIDENCE GUIDE

Resource implications	• Access to items as identified in the Range Statement including an area to set up a temporary work location and standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace-relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, materials, work instructions and deadlines

AURM3402A Assemble and prepare a competition vehicle

Unit descriptor

This unit covers the competency to assemble a competition vehicle in accordance with team requirements, supplementary regulations and component suppliers' specifications. This includes preparing components for assembly, installation of sub-assemblies and systems, and setting vehicle baseline configuration.

Prerequisites

AURM3410A	Perform torquing and fastening
AURM3405A	Conduct non-destructive testing
AUR17108A	Carry out wheel alignment operations

ELEMENT	PERFORMANCE CRITERIA
1. Collect information and analyse assembly requirements	1.1 Team instructions, supplementary regulations and component supplier specifications are used to determine job requirements including design, quality, material, equipment, and quantities
	1.2 Specifications are checked for required operating conditions, and clarification of specifications is sought where required
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 Steps and stages in the process are determined
	1.5 Proposals for modifications/adaptation of equipment are made
	1.6 Component requirements are listed and communicated to appropriate personnel
	1.7 Procedures for minimising waste material are determined
2. Prepare work area and equipment	2.1 Tools and equipment are identified and checked for safe and effective operation
	2.2 Work area is cleaned and laid out appropriately for job requirements
	2.3 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons

ELEMENT	PERFORMANCE CRITERIA
3. Prepare components for assembly	3.1 Components are cleaned to facilitate pre-assembly inspection using appropriate method
	3.2 Precautions are taken to avoid component damage
	3.3 Components are inspected for function and quality and are organised to ensure optimum use of resources
	3.4 Problems with the components are identified and reported to appropriate persons
4. Install sub-assemblies	4.1 Sub-assemblies are inspected for quality and readiness for installation
	4.2 Appropriate installation sequences and techniques are used
	4.3 Sub-assemblies are installed and fasteners tensioned to team/component supplier specifications
	4.4 Checks are made during and after installation to ensure accurate and complete fitting
	4.5 Problems with the sub-assemblies are identified and reported to appropriate persons
5. Install ancillary systems	5.1 Location of critical components is determined on the basis of function, susceptibility to damage and ease of maintenance
	5.2 Critical components are installed and fasteners tensioned to team/component supplier specifications
	5.3 Optimum layout for wiring loom/connectors/hoses/hard lines and ancillary components is determined
	5.4 Wiring loom/connectors/hoses/hard lines and ancillary components are installed and fasteners tensioned to team/component supplier specifications
	5.5 Entire installation is secured and shielded as appropriate to maximise reliability and minimise susceptibility to damage
	5.6 Checks are made during and after installation to ensure accurate and complete fitting
	5.7 Problems with the components are identified and reported to appropriate persons

ELEMENT	PERFORMANCE CRITERIA
6. Conduct post-assembly checks	6.1 Fluids are checked and topped up
	6.2 Temporary bungs and covers are removed
	6.3 Engine pre-start checks are conducted
	6.4 Pressures, temperatures, noises and leaks are checked
	6.5 Sub-assembly and systems operation are checked
7. Set vehicle baseline configuration	7.1 Team instructions, category regulations and component supplier specifications are used to determine vehicle baseline settings
	7.2 A level surface is established to place vehicle on for set-up
	7.3 Appropriate springs and dampers are determined and installed
	7.4 Ride height is measured and adjusted if necessary
	7.5 Corner weight is measured and adjusted if necessary
	7.6 Steering angles are measured and adjusted if necessary
	7.7 Any potential or existing problems are identified and reported in accordance with enterprise procedures
8. Clean up work area and maintain records	8.1 Tools are maintained and returned to storage
	8.2 Surplus components/consumables are tagged and shelved/stored
	8.3 All surplus material is removed from work area
	8.4 Any spillage from work area and vehicle is cleaned up
	8.5 Team/component supplier documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work involves analysing competition vehicle assembly requirements, installing sub-assemblies and systems and setting vehicle baseline configuration
- Competition vehicles include motorcycles, cars, trucks and watercraft modified or built specifically for competition
- Ancillary systems include but are not limited to pneumatic, fluid, communications, electrical/electronic, and fire systems

RANGE STATEMENT

Critical components

- Critical components include:
  - electronic control units
  - data acquisition system components
  - communication equipment
  - circuit breakers, relays and isolation switches
  - fuel tank/cell
  - pumps and reservoirs
  - fire bottles and controller

Securing methods

- Securing methods may include, but not be limited to:
  - tie wraps
  - spiral wrap/heat shrink
  - line clamps

Shielding

- Shielding may include protection from, but not be limited to:
  - heat
  - vibration
  - radio frequency interference
  - impact

Cleaning methods

- Cleaning methods may include, but not be limited to:
  - solvent baths
  - chemical cleaning
  - pressure cleaning
  - ultrasonic cleaning
  - bead blasting

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements

RANGE STATEMENT

Unit context (continued)	• Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the assembly and preparation of a competition vehicle
Tools and equipment	• Tools and equipment are to include component supplier specified tools and may include, but not be limited to non-destructive testing equipment, measuring devices, hand and power tools and vehicle
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Controlling body rules, category rules and supplementary regulations • Team/enterprise procedures relating to assembling and preparing competition vehicles • Task instructions including work sheets, check lists, plans, drawings and designs • Team/enterprise procedures relating to reporting and communication • Team/enterprise procedures relating to the use of tools and equipment • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence	• Interpret and apply team requirements, controlling body and category rules and supplementary regulations • Correctly apply and use safety equipment and personal protective equipment

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
- achieve required outcomes within team time and quality standards Correctly assemble and prepare a minimum of two (2) competition vehicles in situations which involve: (each of the following must be covered on at least one (1) vehicle):
  - install electrical/electronic systems
  - install fluid/pneumatic/fire systems
  - conduct post assembly checks
  - set vehicle baseline configuration
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Controlling body rules, category rules, supplementary regulations, component supplier specifications and team requirements/job specifications
- Work area and component layout
- Component cleaning methods and precautions
- Sub-assembly and system installation sequence and techniques
- Critical components location selection
- Optimum layout for conduits and ancillary components
- Types of securing devices and securing methods
- Types of shielding devices and shielding methods
- Establishing a level surface for vehicle setup
- Setting vehicle baseline configuration
- Record keeping techniques
- Procedures for reporting equipment faults and component defects

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Workplace guidelines regarding acceptable tolerance levels
- OH&S policies and procedures

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to competition vehicle assembly and preparation, team requirements, manufacturer/component supplier specifications, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with supervisors, and other team members, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the coordination of equipment, systems and material to avoid any backtracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the assembly of a competition vehicle. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Use pre-checking and inspection techniques to anticipate assembly problems, in order to work efficiently and effectively. (Level 2)
Use technology	Use the workplace technology related to torquing and fastening including tools, equipment, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to competition vehicles and associated assembly tools in real or appropriately simulated situations involving the application of assembly techniques to the related computing, operational and inventory support systems This includes real or simulated work areas, material, equipment and information on work specifications, customer requirements, organisation procedures, relevant safety procedures and regulations and quality standards
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM3403A Collect and log motorsport data

Unit descriptor

This unit covers the competency to collect and log motorsport data. It includes identifying data required, preparing manual data collection methods and data acquisition systems for operation, capturing and storing data, and preliminary data evaluation.

ELEMENT	PERFORMANCE CRITERIA
1. Identify situations where motorsport data is required	1.1 Purpose of data collection is identified
	1.2 Sources of data are identified
	1.3 Team instructions and procedures are used to specify data requirements
	1.4 End-users of motorsport data are identified
	1.5 Controlling body rules, category rules and supplementary regulations are interpreted
	1.6 OH&S requirements including personal protection needs are observed throughout the work
2. Prepare resources for data collection	2.1 Check lists/recording sheets are developed according to team specifications
	2.2 Manual instruments are prepared for data collection
	2.3 Electronic data acquisition system settings are checked
	2.4 Equipment settings, calibration, system check and adjustments are made in accordance with task requirements and equipment manufacturer/component supplier instructions
	2.5 Trial runs are conducted to check equipment and procedures for function, accuracy and efficiency
	2.6 Necessary adjustments are made to equipment and/or procedures
3. Collect data	3.1 Data acquisition system start-up procedure is carried out in accordance with manufacturer/component supplier instructions
	3.2 Data acquisition system is operated in accordance with its designed capacity and purpose, and to manufacturer/ component supplier recommendations
	3.3 Potential for inaccurate results arising from variables is estimated and described
	3.4 Data is collected using manual and electronic methods
	3.5 Data is checked for accuracy

ELEMENT	PERFORMANCE CRITERIA	
3. Collect data (continued)	3.6	Problems with the required data and/or the operation of the equipment are identified and reported to appropriate persons
4. Log data	4.1	Data is represented on graphs, tables, maps, averages or percentages, ready for preliminary evaluation
	4.2	Data is evaluated for preliminary indication of non-conformity and trends or patterns
	4.3	Findings from the data are collated and reported to appropriate persons
	4.4	Data is stored for later retrieval in accordance with team procedures
5. Maintain data acquisition equipment	5.1	Equipment and support material are cleaned, maintained and prepared ready for further use and stored in accordance with manufacturer/component supplier specifications and team requirements
	5.2	Systems check is conducted
	5.3	Unserviceable equipment is tagged and faults documented in accordance with team procedures
	5.4	Operator maintenance is completed in accordance with manufacturer/component supplier specifications and team procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- This unit covers the work involved in interpreting data acquisition requirements, checking resources, collecting and logging data to monitor performance of competition vehicles
- Data required includes but is not limited to vehicle data, weather data, circuit data and driver/rider characteristics
- Data acquisition systems to be covered in this unit include manual and electronic systems. Electronic systems include logging and display capabilities (either via an integral or remote display, or external computer)
- Manual data includes observation/listening. Instruments include but are not limited to stop watches, video cameras, radar guns, instrument tell tales, temperature tape/paint etc

RANGE STATEMENT

Electronic data acquisition systems

- Electronic data acquisition system components include but are not limited to:
  - sensors and transducers
  - electronic/dash loggers
  - analysis software
  - wiring looms/electrical connectors
  - lap beacons
  - communications and telemetry components
- Electronic data acquisition system settings include but are not limited to:
  - zero/calibration and set sensor limits
  - alarm settings
  - driver/rider preferential display

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in the set up and operation of equipment

Tools and equipment

- Tools and equipment include data acquisition system specific tools and may include but are not limited to, multimeters, hand held calculators, mathematical tables, graphing and charting equipment, computers and manual data collection equipment as specified in the Range Statement

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team requirements relating to data acquisition
- Team procedures relating to the use of data acquisition systems and equipment
- Task instructions including work sheets, check lists and plans
- Team procedures relating to reporting and communication
- Team procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for data acquisition equipment and material
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Apply team requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly collect and log data using manual and electronic systems on a minimum of three (3) occasions. Each of the following must be covered at least twice:
  - vehicle data
  - weather data
  - circuit data
  - driver/rider characteristics

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Collect and log data within relevant team quality and timeliness standards
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment
- Follow team data security and confidentiality procedures at all times

Underpinning knowledge

- End-users of motorsport data and their needs
- Manual and electronic data collection and logging methods and techniques including the production and use of recording sheets
- Types, characteristics, components, uses and limitations of data acquisition systems
- Techniques for inspection and basic fault finding of data acquisition systems
- Procedures for reporting equipment faults and data irregularities
- Preliminary data evaluation techniques
- Manufacturer/component supplier and team guidelines regarding acceptable tolerance levels
- OH&S policies and procedures

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to data acquisition, team requirements, manufacturer/component supplier specifications, plans and safety procedures.

(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information appropriately to supervisors, relevant team members and other persons, to enable confirmation of work requirements and specifications and the reporting of work outcomes and issues. (Level 1)
Plan and organise activities	Apply technical information in a timely manner so that it may be used to avoid any back tracking, work flow interruptions or inefficiencies. (Level 1)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using co-operative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to collect, log and conduct preliminary data analysis. (Level 2)
Solve problems	Create and apply systematic problem solving techniques to anticipate changing information requirements or influences. (Level 2)
Use technology	Use the technology related to data collection including electronic data acquisition systems, calculators and measuring devices and computing/computer aided systems. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a data acquisition system, data collection opportunities, equipment and operating procedures as identified in the Range Statement
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM3404A Comply with motorsport team and event safety requirements

Unit descriptor

This unit covers the competency to comply with motorsport team and event safety requirements. This involves safety in the service area/pit bay, pit lane and pit wall. It includes the use and handling of fuels and hazardous chemicals, personnel movement during the event, competition vehicle control and risk management.

ELEMENT	PERFORMANCE CRITERIA
1. Interpret safety rules and regulations	1.1 Controlling body rules, category rules and supplementary regulations relating to safety requirements are identified
	1.2 Team safety requirements and procedures are identified
	1.3 Personal responsibilities for safety at a motorsport event are identified
	1.4 OH&S requirements including personal protection needs are observed throughout the work
2. Conduct a risk assessment of potential safety hazards in the team operating area	2.1 Potential risks to self and other team personnel are identified
	2.2 Risks are categorised according to severity and impact on team operations
	2.3 Identified risks not addressed by team procedures, controlling body rules, category rules or supplementary regulations are reported to appropriate personnel
3. Apply safe working practices	3.1 Competition vehicle control safety techniques are used appropriately
	3.2 Awareness of competition vehicles, other personnel and tools and equipment is applied during all personal movement in the team operating area
	3.3 All communication is acknowledged and confirmed
	3.4 Team and legislated safety procedures are applied during handling of all dangerous goods and hazardous substances in the team operating and storage areas
	3.5 Unforseen safety hazards are reported to appropriate personnel in a timely manner

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves complying with motorsport team and event safety requirements and safety in the team operating area. It includes the use and handling of fuels and hazardous chemicals, personnel movement during the event, competition vehicle control, servicing and emergency repairs on competition vehicles, working with and around other team members in a demanding environment and risk management
- Conducting a risk assessment of potential safety hazards in the team operating area includes but is not limited to movement of personnel in the team operating area, positioning of personnel prior to and during competition vehicle stops, use of dangerous goods or hazardous substances and emergency repair procedures and team member responsibilities
- The team working area includes but is not limited to the pit lane, pit wall, pit bay, service area, pontoon/jetty, workshop and storage area and competition vehicle transporter

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills conducting risk analyses and applying OH&S procedures
- Competency must be demonstrated at and during a competition event

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include appropriate fire extinguishers, first-aid kits and may include but are not limited to:
  - fire blanket
  - jack lock outs
  - vehicle stop signalling equipment
  - communication equipment
  - vehicle support equipment (e.g. stands)

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and team policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations relating to safety and safety equipment
- Team procedures relating to safety requirements
- Task instructions including work sheets, check lists, plans and drawings
- Team procedures relating to reporting and communication
- Team/enterprise procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures relating to safety
- Australian Design Rules (where applicable)
- OH&S requirements
- Safety body publications
- Team procedures relating to emergency service contacts and term personnel emergency contacts
- Team emergency and event procedures for accidents and/or injury

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage to competition vehicle or equipment
    - achieve required outcomes within team time and quality standards
- Correctly interpret safety rules and regulations, conduct risk assessment of team operating area and apply safe working practices on two (2) occasions. One (1) of these must be at and during an event. Each of the following must be covered:
    - the use, handling and storage of fuels and hazardous chemicals
    - personnel movement during the event, and positioning
    - competition vehicle control
    - servicing and emergency repairs on competition vehicles
    - working with and around other team members
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Relevant state and commonwealth OH&S requirements
- Controlling body requirements, category rules and supplementary regulations
- Manufacturer/component supplier specifications and safe operating procedures
- Team safety policies and procedures including emergency procedures relating to accident and injury

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Identification and classification of dangerous goods and hazardous substances relevant to motorsport Dangerous goods and hazardous substances handling and storage requirements
- Safety and personal protective equipment and correct applications (includes but is not limited to closed in shoes, long trousers, fire suit, gloves helmet, eye and ear protection, etc.)
- Competition vehicle movement procedures
- Preventative measures such as maintenance of a clean and tidy work area, resource storage, and clean and functioning tools and equipment

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to controlling body rules, category rules and supplementary regulations, OH&S requirements and team procedures related to safety. (Level 1)
Communicate Ideas and Information	Communicate ideas and information to enable identified risks to be managed. (Level 2)
Plan and Organise Activities	Plan and organise activities including work tasks and flow to avoid any potentially hazardous practices to self and others. (Level 1)
Work with Others and in a Team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise safety and workflow. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements relating to team operating area layout and equipment positioning. (Level 1)
Solve problems	Use pre-checking and inspection techniques to anticipate potentially hazardous situations and work procedures to avoid accidents, injury and damage to competition vehicle, tools and equipment. (Level 1)
Use technology	Use the workplace technology related to safe handling, including safety tools and equipment. (Level 1)

EVIDENCE GUIDE

Resource Implications

- Access to controlling body rules, category rules, supplementary regulations, safety and hazardous substances legislation and team procedures as identified in the Range Statement
- Access to situations that provide a motorsport event environment for the development and assessment of relevant skills

Method of Assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts (i.e. workshop and event – or simulated event environments)
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of Assessment

- Assessment must occur in a workplace and at and during an event, or in a workshop and event simulated environments with relevant process equipment, material, work instructions and deadlines

AURM3405A Conduct non-destructive testing

Unit descriptor

This unit covers the competency to perform non-destructive testing on competition vehicle components and material. It includes dye penetrant, magnetic particle, Rockwell and Brinell hardness testing.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for non-destructive testing	1.1 Team instructions, controlling body rules, category rules, supplementary regulations and component supplier specifications are used to determine job requirements including quality, material, equipment, and quantities
	1.2 OH&S requirements including personal protection needs are observed throughout the work
	1.3 Inspection areas are cleaned and prepared for testing using appropriate procedures and material
	1.4 Tools and equipment are identified and checked for safe and effective operation
	1.5 Testing equipment is prepared for non-destructive testing in accordance with equipment manufacturer/component supplier instructions and team requirements
	1.6 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons
2. Perform non-destructive testing	2.1 Appropriate testing method/s are identified using standard operating procedures and team requirements
	2.2 Hazards associated with testing are determined, and safety requirements identified
	2.3 Testing is carried out in accordance with relevant task instructions, team procedures and OH&S requirements
	2.4 Non-conformance and defects are identified against component manufacturer/component supplier specifications and team standards
	2.5 Test results are verified where appropriate by using reliable alternative or optional processes
	2.6 Test results are documented in accordance with team procedures

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area	3.1 Testing equipment is maintained and stored in accordance with team procedures and OH&S requirements
	3.2 Work area is cleaned and prepared for subsequent use

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work involves the non-destructive testing of competition vehicle components in order to determine component serviceability by checking for material defects/malfunctions
- Non-destructive testing equipment includes dye penetrant, magnetic particle, Rockwell and Brinell hardness testing equipment
- Magnetic particle testing includes portable or fixed (yoke or bench) testing techniques
- Components to be tested include those used in the construction of competition vehicles (e.g. final drive, steering, brake, roll cage, gear components etc)

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in the detection of material defects through observation and testing
- Competency may be demonstrated in workplaces involved in the design, development, manufacture and maintenance of performance vehicles and/or performance vehicle components and assemblies used in motorsport

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include dye penetrant test kit, magnetic particle test kit, Rockwell hardness tester and Brinell hardness tester

Material

- Material include material used for construction of competition vehicle components

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and team policies and practices

Information and procedures

- Team procedures relating to the use of tools and equipment
- Work instructions, including work sheets, material safety data sheets, assembly procedures, plans, drawings, designs and check lists
- Workplace and team procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures
- Controlling body rules, category rules and supplementary regulations

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body rules, category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Prepare equipment for testing (including zeroing and calibration checks where appropriate)

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Correctly conduct non-destructive testing on a minimum of four (4) components. Each component must be tested using at least two (2) testing methods as detailed in the range statement. Each of the following must be covered:
  - select and apply appropriate testing method/s
  - verify results using reliable alternative process
  - record outcomes
- Perform work within relevant team quality and timeliness standards
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Principles and methods of penetrant, magnetic, Rockwell and Brinell hardness testing, including limitations, advantages and hazards associated with testing
- Non-destructive testing terminology
- OH&S policies and procedures related to non-destructive testing
- Non-destructive testing equipment use, maintenance and storage
- Non-destructive testing preparation procedures
- Non-destructive testing verification methods and techniques
- Non-destructive testing analysis techniques
- Techniques for recording results of non-destructive testing

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, analyse, organise and understand information related to non-destructive test results. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements, coordination of work with technical supervisors, other technicians and workers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and obtaining equipment and material to avoid any back-tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate issues, avoid reworking and wastage. (Level 2)
Use technology	Use the workplace technology related to non-destructive testing including tools, equipment and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to tools and equipment as identified in the Range Statement, and relevant technical references or information
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM3406A Construct hose/pipe assemblies for competition vehicles

Unit descriptor

This unit covers the competency to construct hose/pipe assemblies for competition vehicles. This includes calculating material, selecting components, constructing and testing hose/pipe assemblies.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Team instructions, supplementary regulations and component supplier specifications are used to determine job requirements including design, quality, material, equipment, and quantities
	1.2 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.3 Specifications are checked and clarification of specifications is sought where required
	1.4 Hose/pipe type and fittings are determined according to application
	1.5 Tools and equipment are identified and checked for safe and effective operation
	1.6 Work area is cleaned and laid out appropriately for job requirements
	1.7 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons
	1.8 Procedures for minimising waste material are determined
2. Construct hose/pipe assemblies	2.1 Hose/pipe length is measured/calculated
	2.2 Hose/pipe is cut to length
	2.3 Hose/pipe is bent to conform to fitting requirement
	2.4 Fittings are installed and secured in accordance with component suppliers' specifications and procedures and/or team requirements
	2.5 Assembly is cleaned and pressure-tested

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain records	3.1 Tools are maintained and returned to storage
	3.2 Surplus components/consumables are tagged and shelved/stored
	3.3 All surplus material is removed from work area
	3.4 Any spillage from work area and vehicle is cleaned up
	3.5 Team/component supplier documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- This unit covers the competency to construct hose/pipe assemblies for competition vehicles. This includes calculating material, selecting components, constructing and testing hose/pipe assemblies
- Techniques may include:
  - measuring
  - calculating
  - cutting
  - bending
  - flaring
  - assembling
  - testing
- Components may include, but are not limited to:
  - braided hose (fabric, metal, kevlar covered etc.)
  - replaceable hose ends and fittings
  - metal pipe
  - flared and ferrule fittings

RANGE STATEMENT

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the construction of hose/pipe assemblies for competition vehicles

Tools and equipment

- Tools and equipment are to include component supplier specified tools and may include, but not be limited to, testing equipment, hand tools, measuring devices and calculators

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures and standards relating to construction of hose/pipe assemblies for competition vehicles
- Work instructions, including job sheets, checklists, plans, drawings and designs
- Workplace procedures relating to reporting and communication
- Component suppliers' specifications and assembly procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly construct and test hose/pipe assemblies according to application on a minimum of two (2) occasions. Each of the following must be covered:
  - identify suitable hose/pipe and fittings for the application
  - select and apply appropriate construction and assembly techniques
  - test assembly to required specification
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Team requirements/job specifications, supplementary regulations and component supplier specifications are interpreted
- Types of and selection of hose/pipes and fittings. This may include:
  - sizing of hose/pipes and fittings (e.g. AN dash number, SAE, NPT etc)
  - swaged and re-useable fittings
  - hose/pipe material and construction
  - hose/pipe material fuel/lubricant/chemical compatibility
- Interpreting hose/pipe and fitting charts
- Location and layout of hose/pipe assembly considerations

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Measurement and calculation of hose/pipe lengths
- Calculating flow rate and pressures
- Measurement and cutting hose/pipes
- Bending and flaring pipes
- Hose/pipe assembly techniques
- Flushing and testing hose/pipe assemblies
- Protection methods for hose/pipe assemblies
- Storage and maintenance of hoses/pipes
- Procedures for reporting equipment faults and component defects
- Workplace guidelines regarding acceptable tolerance levels
- Workplace safety policies and procedures

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to data acquisition, team requirements, manufacturer/component supplier specifications, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with site managers, supervisors, and other workers, and the reporting of work outcomes and problems. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the work site and the coordination of equipment, systems and material to avoid any backtracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the construction of hose/pipe assemblies for competition vehicles. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate assembly problems, in order to work efficiently and effectively. (Level 2)
Use technology	Use the workplace technology related to the construction of hose/pipe assemblies for competition vehicles including tools, equipment, calculators and measuring devices. (Level 1)

EVIDENCE GUIDE

Resource implications

- Access to hose/pipe construction and testing tools and equipment involved in the construction of hose/pipe assemblies for competition vehicles and related computing, operational and inventory support systems

  This includes real or simulated work areas, material, equipment and information on work specifications, customer requirements, organisation procedures, relevant safety procedures and regulations and quality standards

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM3407A Coordinate operations of a motorsport team

Unit descriptor

This unit covers the competency to coordinate operations of a motorsport team at club/non-professional level. It includes organising team personnel, finances, logistics, time management and strategy development.

ELEMENT	PERFORMANCE CRITERIA
1. Develop team role and responsibility descriptions	1.1 Team goals are determined in consultation with all team members and review schedule developed
	1.2 Team roles and responsibilities are determined and review schedule developed
	1.3 Roles and responsibilities are checked for compliance with controlling body rules, category rules and supplementary regulations requirements
	1.4 Roles and responsibilities are modified where appropriate
	1.5 Team roles and responsibilities are documented and implemented
2. Manage team finances	2.1 Team financial requirements are estimated in consultation with appropriate team members
	2.2 A team budget is prepared
	2.3 Financial documentation procedures are devised
	2.4 Financial transactions are documented
	2.5 Financial reports are prepared and presented to team members for review
3. Develop team competition strategy	3.1 Input is sought from team members
	3.2 Past performance is reviewed where relevant
	3.3 Team strategies are devised for attaining competitive advantage (including technical, promotional and/or psychological advantage)
	3.4 Contingency strategies are devised
4. Coordinate team participation at events	4.1 Team event schedule is developed and distributed to all team members
	4.2 Team travel (and accommodation where appropriate) requirements are arranged
	4.3 Responsibilities and tasks are allocated to team members and they are appropriately briefed
	4.4 Competition vehicle preparation is supervised

ELEMENT	PERFORMANCE CRITERIA
4. Coordinate team participation at events (continued)	4.5 Competition vehicle transport requirements are arranged
	4.6 Team operations at events are supervised and regular checks are made with all team members
5. Coordinate post-event activities	5.1 Post-event team debriefing sessions are arranged
	5.2 Competition vehicle post-event check and repairs are coordinated
	5.3 Component and material replenishment are appropriately coordinated

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves management of a small motorsport team at club/non-paid level. It includes basic personnel, financial, logistics and strategy management of a minimum of three (3) people in an informal, but competitive environment
- Team members will perform a variety of roles, meeting to practise and compete during their leisure hours. Whilst relatively minor in scope, this unit develops the basic skills needed for motorsport team management at a professional level

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Tasks require individuals to demonstrate discretion, judgement and problem solving skills in the development of team roles and responsibilities, financial and logistics management
- Competency may be demonstrated in a motorsport team workplace, a simulated environment, or workplaces of enterprises supporting and working closely with motorsport teams

RANGE STATEMENT

Schedules and activities

- Team schedules include competition events, practice, promotional and test days
- Promotional activities and follow-up includes liaison with media, promotional partners/sponsors and dissemination of team performance

Tools and equipment

- Tools and equipment include financial recording systems (e.g. computer software, financial transactions book etc.) and may include but are not limited to project management software, databases, electronic diaries etc

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and team policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team procedures relating to team operations
- Task instructions including work sheets, check lists and plans
- Team procedures relating to reporting and communication
- Team procedures relating to the use of tools and equipment
- Environmental, hazardous chemical and dangerous goods legislation and local requirements relating to the disposal and use of fuels, lubricants, coolants and cleaning agents
- Relevant financial institution requirements

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Achieve required outcomes within team time and quality standards
- Develop and implement appropriate team operational requirements for a minimum of two (2) events. Operational areas to include, as a minimum:
  - team member roles and responsibilities
  - team financial management
  - event participation
  - competition strategy
  - post-event activities
- Operational requirements are to include at a minimum, roles, responsibilities, accountability and processes/procedures
- Conduct all work to relevant quality and timeliness standards
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations
- OH&S requirements, including relevant state and commonwealth legislation, safety management systems and safe operating procedures
- Communication principles
- Group dynamics principles
- Basic bookkeeping systems
- Scenario and logistics planning
- Time management strategies

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to category rules and supplementary regulations, team requirements, bookkeeping requirements and financial reporting to ensure compliance with all rules and regulations. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable effective team operation. (Level 2)
Plan and organise activities	Plan and organise activities including team practice and attendance at events (including test sessions). (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly determine requirements and keep financial records. (Level 2)
Solve problems	Use knowledge of group dynamics, scenario planning, logistics and financial planning to keep team operating. (Level 3)
Use technology	Use the workplace technology related to planning and logistics including computer software. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to controlling body rules, category rules and supplementary regulations and relevant legislation as identified in the Range Statement

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines
- Assessment of this competency may include project related tasks and require portfolios or other forms of indirect evidence of process

AURM3408A Perform competition vehicle preparation procedures at an event

Unit descriptor

This unit covers the competency to perform competition vehicle preparation at the event location. This includes interpreting category, event and 'on the day' team specifications, finalising technical preparation, preparing a vehicle for scrutineering, conducting pre-race checks and post-race maintenance.

Prerequisites

AURM3402A Assemble and prepare a competition vehicle

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Team instructions/specification and category rules and supplementary regulations are used to determine job requirements including configuration, quality, equipment, and quantities
	1.2 Task requirements are checked against 'on the day' operating conditions and clarification of specifications is sought where required
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 Tools and equipment are identified and checked for safe and effective operation
	1.5 Work area is cleaned and laid out appropriately for job requirements
2. Finalise technical preparation	2.1 Vehicle settings for the next race are configured in accordance with team specifications, baseline configurations, category rules and supplementary regulations
	2.2 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons
	2.3 Proposals for modifications/adaptation of equipment are made
	2.4 Settings are documented in accordance with team procedures
3. Conduct pre-race checks	3.1 Checks are conducted in accordance with team checklists
	3.2 Precautions are taken to ensure no component damage
	3.3 Problems with the components or systems are identified and reported to appropriate persons

ELEMENT	PERFORMANCE CRITERIA
4. Prepare vehicle for scrutineering	4.1 Vehicle systems and safety components are inspected in accordance with regulatory body requirements, category rules and supplementary regulations
	4.2 Problems with vehicle compliance are identified and rectified
	4.3 Problems with vehicle compliance that cannot be rectified are reported to appropriate persons in accordance with team procedure
5. Conduct between race maintenance	5.1 Components/systems condition is inspected in accordance with team checklist and repair/replace
	5.2 Vehicle is cleaned and refuelled
	5.3 Manual data/download electronic data is collected and logged
	5.4 Driver/rider technical debrief is conducted or contributed to
6. Clean up work area and maintain records	6.1 Tools are maintained and returned to storage
	6.2 Surplus components/consumables are tagged and shelved/stored
	6.3 Surplus material is removed from work area
	6.4 Spillage is cleaned from work area and vehicle
	6.5 Loading of vehicle and equipment for transportation is assisted and dismantling of temporary work location is undertaken
	6.6 Team/event documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables etc:

Unit scope

- Work includes interpreting team ‘on the day’ specifications at an event, finalising technical preparation, conducting pre-event checks, preparing vehicle for scrutineering, conducting between race maintenance, cleaning up the work area and finalising documentation
- For the purpose of this unit of competency, a race is defined as each of the items in a program such as a heat, final, test run, time trial, promotional ride etc. as distinct from a race meeting or event

RANGE STATEMENT

Unit scope (continued)

- Components/systems to be inspected include, but are not limited to consumable items such as tyres, brake pads etc. and non-consumable components such as steering linkages, driveshafts etc.

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the preparation of a competition vehicle at an event

Vehicle settings

- Vehicle settings may include:
  - aerodynamic devices
  - engine/engine management
  - driveline including gear ratios
  - suspension
  - driver/rider comfort considerations
  - fuel load
  - brakes
  - data acquisition system

Tools and equipment

- Tools and equipment are to include, but not be limited to measuring devices, refuelling equipment and hand tools

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team procedures and standards relating to performing competition vehicle preparation procedures at an event
- Task instructions including work sheets, check lists, plans, drawings and designs

RANGE STATEMENT

Information and procedures (continued)

- Team procedures relating to reporting and communication
- Team procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly perform competition vehicle preparation procedures on at least two (2) occasions. At least one (1) of these must be at and during an event. Each of the following must be covered:
  - finalise technical preparation prior to a race
  - conduct pre and post race checks and maintenance
  - prepare a vehicle for scrutineering
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations and team requirements/job specifications
- Work area layout at an event
- Preparation processes applicable to competition vehicles at an event
- Scrutineering requirements and appropriate inspection techniques
- Gear ratio calculations
- Pre-race checks and between race maintenance conduct
- Record keeping techniques
- Equipment faults and component defects reporting procedures
- Workplace guidelines regarding acceptable tolerance levels
- OH&S policies and procedures

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to competition vehicle preparation, team requirements, category rules and supplementary regulations, component suppliers' specifications, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with supervisors, and other team members and the reporting of work outcomes and problems. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the coordination of equipment, systems and material to avoid any backtracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the preparation of a competition vehicle. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate preparation problems, in order to work efficiently and effectively. (Level 2)
Use technology	Use the workplace technology related to preparation of a competition vehicle including tools, equipment, measuring devices and computers. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to competition vehicles and associated tools in real or appropriately simulated situations involving the application of preparation techniques and the related computing, operational and inventory support systems

  This includes real or simulated work areas, material, equipment and information on work specifications, team requirements, organisation procedures, relevant safety procedures and regulations and quality standards

EVIDENCE GUIDE

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts.
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge.
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility (as detailed in the Critical Aspects of Evidence) with relevant process equipment, material, work instructions and deadlines

AURM3409A Perform pit lane/service area operations

Unit descriptor

This unit covers the competency to perform pit lane/service area operations within event time constraints. This includes preparation for vehicle stops, servicing during stops, performing adjustments and emergency repairs and post stop clean up.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Team instructions/specification and category rules and supplementary regulations are used to determine job requirements including configuration, quality, equipment, and quantities
	1.2 OH&S requirements including complying with controlling body rules, category rules and supplementary regulations, equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.3 Path of movement (obstacles, hazards and safety conditions) is considered in positioning of equipment and tools and appropriate measures taken to eliminate hazards
	1.4 Tools and equipment are identified and checked for safe and effective operation
	1.5 Work area is cleaned and laid out appropriately for job requirements
2. Follow pit lane/service area safety procedures	2.1 Jacks and other lifting devices (including lifting lock-outs) are fitted prior to underbody servicing
	2.2 Fire hazard and prevention procedures are followed according to team procedures and/or event category rules and supplementary regulations
	2.3 Pit lane/service area signals are used as per team procedures and event category rules and supplementary regulations
	2.4 Event category and supplementary regulations relating to pit lane/service area operations are followed
	2.5 Non-team personnel access to pit area and walkways is monitored as per team procedures

ELEMENT	PERFORMANCE CRITERIA
3. Conduct pit-stop/ competition vehicle service	3.1 Competition vehicle components are checked as per team pit-stop/service area schedule
	3.2 Minor adjustments are performed in accordance with instructions
	3.3 Emergency repairs are conducted in accordance with instructions
	3.4 Components are replaced
	3.5 Work practices and pit stop/service area procedures are modified to manage contingency issues
	3.6 Problems are reported to appropriate team members
4. Conduct post-stop clean-up	4.1 Tools and equipment are prepared and positioned ready for the next vehicle stop
	4.2 Surplus components/consumables are tagged and shelved/stored
	4.3 Spillage is cleaned and clean-up material correctly disposed of
	4.4 Team/event documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves all work carried out on competition vehicles during pit lane, pit bay or service area stops. Pit lane includes the pit area for circuit racing, service areas for rally events, and service berths for boat racing events
- Work includes servicing of the vehicle as allowed in event category and supplementary regulations, emergency repairs or supporting driver change-over
- Stops include scheduled stops as per event category/supplementary regulations and unscheduled stops for emergency repairs or refuelling
- Pit-stops/competition vehicle servicing tasks may include but are not limited to replacing tyres/wheels, refuelling, cleaning windscreen/visor/fairing screen, minor adjustments (wing angles, weight jackers etc) and removing pit stop notification tag

RANGE STATEMENT

Unit context	• OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures • Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in the application of instructions and reporting of problems to appropriate team members • Competency must be demonstrated in an event environment during an event
Tools and equipment	• Tools and equipment may include gas bottles and boom, toolbox components (e.g. spanners, wrenches, screwdrivers etc), race tape, impact (rattle) gun, refuelling churns/rigs, lubricants and coolants, tyre pressure gauges and pyrometers, go-jacks, safety jacking stands, lifting stands, tyre warmers and restarting equipment
Material	• Material may include automotive fuel, coolants, lubricants and cleaning agents as specified by event category, supplementary regulations or team procedures
Personal protective equipment	• Personal protective equipment may include closed shoes, long trousers, fire retardant gloves, crash helmets and other equipment as specified by relevant legislation, team procedures, event category rules and supplementary regulations
Information and procedures	• Controlling body rules, category rules and supplementary regulations • Team/enterprise procedures relating to pit lane/service area operations • Task instructions including work sheets, check lists, plans, drawings and designs • Team/enterprise procedures relating to reporting and communication • Team/enterprise procedures relating to the use of tools and equipment

RANGE STATEMENT

Information and procedures (continued)

- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly perform pit lane/service area operations at least three (3) times. At least two (2) of these must be at and during a competition event in situations where there are variations in:
  - weather conditions
  - adjustments and emergency repairs
  - sequence of pit stop/competition vehicle service (e.g. no tyre change, fuel and screen clean only or rear tyres and debris clean only etc)
- Work with and around other team members
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations and team requirements/job specifications
- Work area layout at an event
- Preparation processes applicable to pit stops/service area
- Pit stop/service area sequence and conduct
- Pit/lane service area signals and communication techniques
- Emergency repair methods and techniques
- Record keeping techniques
- Equipment faults and component defects reporting procedures
- Workplace guidelines regarding acceptable tolerance levels
- OH&S policies and procedures

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to servicing procedures and emergency repairs. (Level 1)
Communicate ideas and information	Communicate ideas and information to respond to issues during pit stops/competition vehicle servicing and to report problems for post-stop or post-event analysis. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including conduct of service procedures to avoid any backtracking or workflow interruptions. (Level 1)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow within strict timelines. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and adjustments. (Level 1)
Solve problems	Use checking and inspection techniques to identify faults and/or required adjustments, and analysis and judgement when interpreting instructions for adjustment and emergency repair within strict timelines. (Level 2)
Use technology	Use the workplace technology related to servicing and conducting emergency repairs on a competition vehicle, including tools, equipment and measuring devices. (Level 1)

EVIDENCE GUIDE

Resource implications

- Access to a competition vehicle during an event as identified in the Range Statement, motorsport team procedures and instructions, and relevant equipment and material

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a minimum of three event environments
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines
- At least three (3) assessments must occur at a competition event

AURM3410A Perform torquing and fastening

Unit descriptor

This unit covers the competency to torque and fasten competition vehicle components to supplier and team specifications. This includes fastener types, preparation of components, selection of appropriate tools, knowledge of material stress, and the application of fastener securing methods.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Component supplier and team torquing and fastening specifications are read and interpreted
	1.2 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.3 Tools and equipment are identified and checked for safe and effective operation
	1.4 Work area is cleaned and laid out appropriately for job requirements
	1.5 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons
2. Fasten components	2.1 Material are selected according to application
	2.2 Components are inspected and prepared for assembly
	2.3 Appropriate installation sequences and techniques are used to assemble components including applying/installing gaskets, sealants, adhesives and/or lubricants where appropriate
	2.4 Fasteners are tensioned to team/component supplier specifications in specified stages and sequence
	2.5 Checks are made during and after installation to ensure accurate and complete fitting
	2.6 Mechanical fastener securing devices are fitted where appropriate
	2.7 Sealant and liquid locking adhesive cure times are observed if applicable
	2.8 Problems with the components are identified and reported to appropriate persons

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain records	3.1 Tools are maintained and returned to storage
	3.2 Surplus components are tagged and shelved/stored
	3.3 All surplus material is removed from work area
	3.4 All spillage from work area and vehicle is cleaned up
	3.5 Team/component supplier documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work includes torquing and fastening competition vehicle components to supplier and team specifications. This includes fastener types, preparation of components, selection of appropriate tools, knowledge of material stress, and the application of fastener securing methods.
- Torque measurements and fastener tensions are undertaken using conventional torque wrenches, angular torque tools and strain gauges

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in the set up and operation of machines
- Competency may be demonstrated in workplaces involved in the design, development, manufacture and maintenance of performance vehicles and/or performance vehicle components and assemblies used in motorsport

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include torque (tension) wrenches, angular torque tools, dial test indicators, feeler gauges, special service tools and hand tools, and may include but not be limited to strain gauges, vertical height gauges and gauge blocks

Material

- Material selected are to include:
  - type and grade of fastener
  - liquid locking adhesive and primers
  - gasket and/or sealant
  - lock wire/lock tabs or other mechanical fastener securing devices
- Fasteners are to include, but are not limited to threaded fasteners, quick release fasteners, sheet metal fasteners (e.g. rivets etc.)

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations, enterprise policies and practices, team and regulatory body rules and manufacturer/component supplier recommendations

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team/enterprise procedures relating to competition vehicle assembly
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team/enterprise procedures relating to reporting and communication
- Team/enterprise procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for equipment and material
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly fasten a minimum of six (6) different components/sub-assemblies which include:
  - identifying compatibility/incompatibility of material, adhesives, fittings, and fasteners for the application
  - selecting and applying appropriate assembly, torquing and fastening techniques
  - ensuring that the assembly satisfies the relevant specification

  where the components/sub-assemblies necessitate the use of a range of fasteners, sealants and fasteners securing devices
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Types, characteristics, uses and limitations of fasteners used in motorsport/performance enhancement including material stress
- The types, characteristics, uses and limitations of mechanical locking devices (e.g. lock wire and lock tabs) and chemical/liquid fastener locking devices (e.g. liquid locking compounds/adhesives) including shelf life expiry
- Torquing principles, applications, methods and techniques
- Preparation of components for assembly
- Selection of appropriate tools

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Regulatory bodies requirement relating to securing of fasteners
- OH&S policies and procedures
- Record keeping techniques

Underpinning skills

These include a number of processes learnt throughout work and life and required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to torquing and fastening operations, work orders, plans, checklists and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with technical supervisors, other technicians and workers, and the reporting of work outcomes and problems. (Level 1)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the obtaining of equipment and material to avoid any backtracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and procedures to team specifications. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate torquing and fastening problems, in order to work efficiently and effectively. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology Use the workplace technology related to torquing and fastening including tools, equipment, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to components, fasteners, assemblies, tools and equipment, and material as identified in the Range Statement, and relevant technical information

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM3411A Prepare competition vehicle and support equipment for transportation

Unit descriptor

This unit covers the competency to prepare competition vehicle and support equipment for transportation. It includes selection, preparation and stowage of tools and equipment, preparation of transporter and competition vehicle and loading and unloading of tools, equipment and the competition vehicle.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare specific tools and equipment needed for an event	1.1 Team instructions/specification and category rules and supplementary regulations are used to determine job requirements including configuration, quality, equipment, and quantities
	1.2 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.3 Specific tools and equipment needed for an event are identified and selected
	1.4 Tools and equipment are correctly packed and secured to avoid damage during transportation
	1.5 Equipment listing is checked, and all resources are accounted for
2. Prepare competition vehicle for transportation	2.1 Competition vehicle is cleaned and prepared for transportation
	2.2 Specific transportation devices, components and covers are fitted
	2.3 Securing locations on vehicle and transporter are determined
	2.4 Problems with the required equipment or vehicle are identified and reported to appropriate persons
3. Load and secure competition vehicle and equipment for transportation	3.1 Checklist for resources and vehicle securing is compiled
	3.2 Loading is conducted to team procedures
	3.3 Vehicle is safely secured and vehicle and equipment securing mechanisms are checked
	3.4 Hazardous material are stored in accordance with legislative requirements
	3.5 Transporter tailgates/ramps and doors/bins are secured

ELEMENT	PERFORMANCE CRITERIA
4. Unload competition vehicle and support equipment	4.1 Competition vehicle is unloaded as per team procedures
	4.2 Tools and equipment are unloaded as per team procedures
	4.3 Transporter is cleaned and prepared for subsequent use
	4.4 Team/event documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves selection, preparation and stowage of tools and equipment, preparation of transporter and competition vehicle and loading and unloading of tools, equipment and the competition vehicle
- Preparation of the competition vehicle may include, but not be limited to removing fluids including fuel, disconnecting battery/power supply, downloading data, gear position or any other requirements that may be necessary for transportation by a third party via means such as road freight, air, rail or ship

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in the loading and unloading of tools, equipment and the competition vehicle
- Competency may be demonstrated in workplaces involved with competition vehicles or in a simulated environment

RANGE STATEMENT

Tools and equipment	• Tools and equipment are to include a competition vehicle, transporter and associated support equipment and may include lifting and material handling equipment • Specific transportation devices, components and covers may include, but are not limited to anti-rub devices, blanking plugs (e.g. exhaust), guards, air filter covers, vehicle covers, transportation tyres/wheels
Personal protective equipment	• Personal protective equipment is to include closed in shoes, and may include long trousers, handling gloves and other equipment as per team procedures, relevant legislation and OH&S requirements
Information and procedures	• Controlling body rules, category rules and supplementary regulations • Event scheduling and location details • Team procedures relating to competition vehicle transportation and security • Task instructions including work sheets, check lists, plans, drawings and designs • Team/enterprise procedures relating to reporting and communication • Team/enterprise procedures relating to the use of tools and equipment • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Australian Design Rules and transportation legislation, (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly prepare, load and unload a competition vehicle and support equipment at least two (2) times, in situations where there are variations in:
  - weather
  - day or night
  - terrain conditions
  - load lists
- Work with and around other team members
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Storage and transportation of relevant hazardous chemicals and dangerous goods
- Competition vehicle transportation preparation methods
- Competition vehicle security principles
- Load distribution principles
- Loading and unloading techniques
- Securing methods and equipment
- Record keeping techniques
- OH&S principles and requirements relating to manual handling and loading heavy equipment

EVIDENCE GUIDE

Underpinning skills

These include a number of processes learnt throughout work and life, and required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to storage and transportation of dangerous goods and hazardous chemicals, team tool and equipment requirements, and event scheduling and location details. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable organisation of tools and equipment and reporting of progress against schedule. (Level 1)
Plan and organise activities	Plan and organise activities including loading and unloading sequence to avoid any backtracking or workflow interruptions. (Level 1)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)
Solve problems	Use checking and inspection techniques to maximise space utilisation. (Level 1)
Use technology	Use the workplace technology related to lifting equipment. (Level 1)

EVIDENCE GUIDE

Resource implications

- Access to a competition vehicle, transporter and associated support equipment, which may include lifting and material handling equipment as identified in the Range Statement, team procedures and securing equipment guidelines

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM4412A Analyse and repair complex performance driveline systems

Unit descriptor

This unit covers the competency to analyse and repair complex performance transmission, final drive and drivelines including engine to transmission drive couplings. This includes testing, determining repair and/or performance enhancement strategies, conducting repairs, adjustments and post-repair checks.

Prerequisites

AUR06666A Repair transmissions (manual)

AUR12666A Repair final drive assemblies

AUR13166A Repair final drive (drivelines)

AURM3405A Conduct non-destructive testing

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the fault	1.1 Controlling body rules, category rules, supplementary regulations and team requirements are used to determine task specifications including configuration, equipment, quality and quantities
	1.2 Benchmark specifications for a correctly functioning transmission/final drive/driveline are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The details of the fault are examined and available preliminary information is documented
	1.5 The effects of the fault are identified and confirmed from direct and/or indirect evidence
	1.6 Possible safety impacts of the fault are considered and responded to in accordance with regulatory and team obligations and practices
2. Prepare for fault analysis	2.1 Possible causes of the fault, including intermittent faults are identified from an analysis of technical support information and available on-board diagnostic systems
	2.2 The most appropriate analysis process, including sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for fault analysis (continued)	2.3 Testing equipment is obtained and prepared for the application in accordance with regulatory, manufacturer/ component supplier and team requirements
	2.4 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.5 Complex performance driveline system components are prepared for the diagnostic process including isolation and cleaning requirements
3. Diagnose the fault and determine repair/ performance enhancement strategies	3.1 The selected analysis process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Test and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Test results and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes
	3.4 Authority is obtained to partly dismantle components, to permit an accurate inspection of analysed fault/s, if required
	3.5 Valid conclusions are drawn about the cause and the direct and indirect consequences of the fault are drawn from available evidence and documented to team requirements
	3.6 Options for rectifying the fault/enhancing performance are identified from research of technical support information
	3.7 The most appropriate option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and team policies
	3.8 The selected repairs/modifications/adaptation of equipment are documented and communicated to appropriate persons including the analysis outcome and repair requirements
4. Conduct repairs/ implement performance improvement strategies	4.1 Repairs and adjustments to components/sub-assemblies are carried out in accordance with manufacturer/component supplier specifications for methods, equipment used and tolerance relative to the system
	4.2 Post-repair checks and vehicle start up are conducted

ELEMENT	PERFORMANCE CRITERIA
5. Clean up work area and maintain records	5.1 Testing equipment and tools are returned to be cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and team requirements
	5.2 Surplus and unserviceable components are removed in accordance with team procedures
	5.3 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons
	5.4 Recording of work/vehicle documentation is inspected for completeness including component life records

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work includes the analysis and maintenance of complex performance transmission, final drive and drivelines including engine-transmission drive couplings. This includes testing, determining repair and/or performance improvement strategies, conducting repairs, adjustments and post-repair checks
- A complex performance transmission is defined as one that is a specialised motorsport/performance component which integrates two or more systems that use either mechanical, hydraulic, pneumatic or electrical/electronic media
- Driveline systems are to cover all sub-systems and components including clutches, torque converters, manual and automatic transmissions, drive shafts and final drives
- Diagnosis is to cover that for module and parts replacement in related electrical, electronic, pneumatic or hydraulic control systems
- Driveline system faults covered by this unit include abnormal gear wear, abnormal clutch operations, contamination, hard shifting, harshness, loose mountings, leaks, lubrication, noises, transmission slippage and vibrations.
- Driveline system faults covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operation

RANGE STATEMENT

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the analysis and maintenance of complex performance driveline systems

Tools and equipment

- Tools and equipment may include, but are not limited to:
  - hand tools
  - manufacturer/component supplier specialist tools
  - jacking and lifting equipment
  - measuring devices and test instruments
  - computerised diagnostic systems
  - computers and related software

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team procedures relating to applying diagnosing and maintaining complex performance driveline systems
- Team records of life of components
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team procedures relating to reporting and communication
- Team procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly analyse, repair and conduct post-repair checks on a minimum of four (4) driveline systems faults (on more than one transmission type), and involve:
  - selection, noise, vibration, harshness or slipping faults
  - with at least two having possible combination causes involved in the sub-systems (clutches, torque converters, transmission, drive shafts and final drives) or control systems
  - where the scope of the faults necessitate the use of a range of testing equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Types, function, operations and limitations of complex performance transmission, final drive, driveline and drivelines including engine-transmission drive couplings such as clutches, torque converters etc.
- Diagnosis and testing procedures and test instrument application
- Symptom and cause differentiation
- Repair and/or performance improvement strategies
- Removal, replacement and repair, adjustment and post-repair check procedures

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Diagnosis theory including concept, design and planning
- Record keeping procedures
- Procedures for reporting equipment faults and component defects
- Team guidelines regarding acceptable quality and tolerance levels
- Equipment safety requirements
- OH&S policies and procedures

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to the analysis and repair of complex performance driveline systems including the relevant technical, regulatory, environmental and safety requirements. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, co-ordination of work with supervisors, and other workers, and the reporting of work outcomes and resolution of problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the co-ordination of equipment, systems and material to avoid any backtracking, work flow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using co-operative approaches to optimise communication, workflow and productivity. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the analysis and repair of complex performance driveline systems. (Level 2)
Solve problems	Create and apply systematic diagnostic and problem solving techniques to anticipate problems, avoid re-working and avoid wastage. (Level 2)
Use technology	Use the workplace technology related to the analysis and repair of complex performance driveline systems including tools, measuring devices, test instruments, workshop equipment, calculators and computers. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to competition vehicles and associated test instruments in real or appropriately simulated situations involving the application of analysis and repair techniques and to the related computing, operational and inventory support systems

  This includes real or simulated work areas, material, equipment and information on work specifications, team requirements, organisation procedures, relevant safety procedures, regulations and quality standards

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM4413A Analyse and repair complex performance fuel systems

Unit descriptor

This unit covers the competency to inspect, analyse and repair complex fuel systems, associated components and refuelling equipment. This includes testing, determining repair and/or performance improvement strategies, conducting repairs, adjustments and post-repair checks.

Prerequisites

AUR03170A	Service petrol fuel systems
AUR03166A	Repair petrol fuel systems
AUR21171A	Service and repair electronic engine management systems

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the fault	1.1 Controlling body rules, category rules, supplementary regulations and team requirements are used to determine task specifications including configuration, equipment, quality and quantities
	1.2 Benchmark specifications for a correctly functioning complex fuel system are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The details of the fault are examined and available preliminary information is documented
	1.5 The effects of the fault are identified and confirmed from direct and/or indirect evidence
	1.6 Possible safety impacts of the fault are considered and responded to in accordance with regulatory and team obligations and practices
2. Prepare for fault analysis	2.1 Possible causes of the fault, including intermittent faults are identified from an analysis of technical support information and available on-board diagnostic systems
	2.2 The most appropriate analysis process, including sequence, tests and testing equipment are developed and/or identified and selected from the range of available options
	2.3 Testing equipment is obtained and prepared for the application in accordance with regulatory, manufacturer/ component supplier and team requirements

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for fault analysis (continued)	2.4 Tools and material required to support the diagnostic process are identified, selected and prepared for use
3. Analyse the fault and determine repair/performance enhancement strategies	3.1 The selected analysis process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Test and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Test results and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes
	3.4 Authority is obtained to partly dismantle components, to permit an accurate inspection of analysed fault/s, if required
	3.5 Valid conclusions are drawn about the cause and the direct and indirect consequences of the fault are drawn from available evidence and documented to team requirements
	3.6 Options for rectifying the fault/enhancing performance are identified from research of technical support information
	3.7 The most appropriate option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and team policies
	3.8 The selected repairs/modifications/adaptation of equipment are documented and communicated to appropriate persons including the analysis outcome and repair requirements
4. Conduct repairs/implement performance improvement strategies	4.1 Repairs and adjustments to components/sub-assemblies are carried out in accordance with manufacturer/component supplier specifications for methods, equipment used and tolerance relative to the system
	4.2 Post-repair checks and vehicle start up are conducted
5. Clean up work area and maintain records	5.1 Testing equipment and tools are returned to be cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and team requirements
	5.2 Surplus and unserviceable components are removed in accordance with team procedures

ELEMENT	PERFORMANCE CRITERIA
5. Clean up work area and maintain records (continued)	5.3 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons
	5.4 Recording of work/vehicle documentation is inspected for completeness

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work includes the maintenance of complex fuel systems used within the motorsport/performance enhancement environment. It includes the operation and function of complex fuel system components and systems, conduct of tests and interpretation of test results in order to analyse faults within complex fuel systems, determining repair and/or performance improvement strategies, conducting repairs, adjustments and post-repair checks
- A complex fuel system is defined as one that is a specialised motorsport/performance system which incorporates a configurable management/control system and may include a duplicate/backup supply system and injection or multiple carburetion configurations
- Fuel systems are to cover all sub-systems and components including fuel cells, pumps, pressure and/or flow regulation, management/control system and injection or multiple carburetion components
- Diagnosis is to cover that for module and parts replacement in related electrical, electronic, pneumatic control systems
- Fuel system faults covered by this unit include, but are not limited to, rough running, under/overfuelling, misfiring, poor performance, contamination and leakage
- Fuel system faults covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operation

RANGE STATEMENT

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the analysis and maintenance of complex fuel systems
- Competency may be demonstrated in workplaces involved in the design, development, manufacture and maintenance of performance vehicles and/or performance vehicle components and assemblies used in motorsport

Tools and equipment

Tools and equipment may include, but are not limited to, hand and power tools, vacuum/pressure gauges, flow meters, exhaust analysers, multimeters, engine diagnostic computer hardware and software

Components

- Components may include, but are not limited to:
  - rollover valves
  - fuel cells
  - fuel lines
  - breathers
  - pick up pumps
  - main pumps
  - filters
  - fuel pots / surge tanks / collector tanks
  - pressure and temperature sensors
  - injectors
  - carburetors
  - hoses and fittings
  - refuelling equipment including churns/rigs, dry break valves, hoses and fittings

RANGE STATEMENT

Personal protective equipment

- Personal protective equipment is to include that prescribed under manufacturer/component supplier specifications, legislation, regulations and enterprise policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team/enterprise procedures relating to applying diagnosing and maintaining complex fuel systems
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team procedures relating to reporting and communication
- Team procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly analyse, repair and conduct post-repair checks on a minimum of three fuel system faults (on more than one fuel system type), and involve:
  - rough running, under/overfuelling, misfiring, poor performance, contamination or leaks

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- with at least one fault having possible combination causes involved in the sub-systems (fuel cells, pumps, pressure and/or flow regulation, management/control system and injection or multiple carburetion components)
- where the scope of the faults necessitates the use of a range of testing equipment

- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Workplace safety policies and procedures related to complex fuel systems
- Types, function, operations and limitations of complex fuel system and components
- Properties of fuels used within the motorsport industry including compatibility with fuel system components
- Complex fuel systems layouts
- Diagnosis and testing procedures and test instrument application
- Symptom and cause differentiation
- Repair and/or performance improvement strategies
- Removal, replacement and repair, adjustment and post-repair check procedures
- Diagnosis theory including concept, design and planning
- Record keeping procedures
- Procedures for reporting equipment faults and component defects
- Team guidelines regarding acceptable quality and tolerance levels
- Equipment safety requirements
- OH&S policies and procedures

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, analyse, organise and understand information related to complex fuel system analysis and repair (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements, coordination of work with technical supervisors, other technicians and workers, and the reporting of work outcomes and problems (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly interpret test results in order to determine required action for the maintenance of fuel systems (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate maintenance and repair problems, avoid reworking and avoid wastage (Level 2)
Use technology	Use the workplace technology related to complex fuel systems including tools, equipment, calculators and measuring devices (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to tools, equipment and fuel systems as identified in the Range Statement including relevant technical references or information

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM4414A Manage motorsport data acquisition

Unit descriptor

This unit covers the competency to configure a data acquisition system, acquire, analyse and present motorsport data. This includes analysis of data and presentation in the form of graphs, charts, tables, comparisons, and reports.

Prerequisites

AURM3403A Collect and log motorsport data

AUR18708A Carry out minor repairs to electrical circuits/systems

MEM2.13C5A Perform mathematical computations

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm data acquisition requirements	1.1 Controlling body rules, category rules, supplementary regulations and team requirements are used to determine task specifications including configuration, equipment, quality and quantities
	1.2 Benchmark specifications for correctly functioning data acquisition are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
2. Configure electronic data acquisition systems	2.1 Tools and material required to support the data acquisition process are identified, selected and prepared for use
	2.2 Component rates/ratios and parameters for input sensors are determined/calculated and entered within system math channels
	2.3 Sample rates are determined and entered
	2.4 Systems check is conducted in accordance with regulatory, manufacturer/component supplier and team requirements
3. Retrieve data	3.1 Team instructions and procedures are used to determine data retrieval requirements for specific purposes
	3.2 Data retrieval process is followed in accordance with specifications and directions
	3.3 Retrieved data is verified where appropriate by using reliable alternate or optional processes
	3.4 Potential for inaccurate results arising from variables is estimated and described

ELEMENT	PERFORMANCE CRITERIA
4. Analyse data	4.1 Comparisons of all sources of collected data are made
	4.2 Mathematical processes are used to analyse data
	4.3 Trends or patterns in data including non-conforming results outside of the predicted outcome, are noted and reasons identified
	4.4 Possible reasons for trends or patterns are investigated
	4.5 Potential performance enhancements solutions are identified
	4.6 Problems with the required data and/or the operation of the equipment are identified and reported to appropriate persons
5. Present data	5.1 End-users of statistical data and their preferred format are identified
	5.2 Data is represented appropriately according to end-user needs
	5.3 Appropriate recommendations are devised and documented
	5.4 Recommendations are presented with supporting data
6. Clean up work area and maintain equipment	6.1 Data that can be reused is retrieved and stored appropriately
	6.2 Equipment and support material are cleaned, maintained and prepared ready for further use and stored in accordance with manufacturer/component supplier specifications and team requirements
	6.3 Waste material is removed according to team procedures
	6.4 Faults in data acquisition systems and components are diagnosed
	6.5 Unserviceable equipment and faults are documented and appropriate action taken in accordance with team procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves configuring a data acquisition system, acquiring, analysing and presenting motorsport data. This includes analysis of data and presentation in the form of graphs, charts, tables, comparisons, and reports.
- Data acquisition systems to be covered in this unit include systems with logging and display capabilities (either via a integral or remote display or external computer)
- Data presentation methods include, but are not limited to, tables, graphs, maps, averages, percentages, ratios and diagrams
- Data required includes, but is not limited to, vehicle data, weather data, circuit data, driver/rider characteristics, systems capability and vehicle design specifications
- End-users of data include, but are not limited to, driver/rider, technical supervisor(s), team management, sponsors/promotional/technical partners and media outlets
- Security and confidentiality are critical aspects of data acquisition and reporting

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the set up and operation of data acquisition equipment

Tools and equipment

- Tools and equipment are to include specific data acquisition system tools and may include, but are not limited to, multimeters, computers, hand held calculators, mathematical tables, graphing and charting equipment

RANGE STATEMENT

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and team policies and practices

Information and procedures

- Workplace procedures relating to the use of data acquisition systems and equipment
- Team procedures including job sheets, check lists, plans, drawings and designs
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly configure data acquisition system, acquire, analyse and present motorsport data on a minimum of three (3) occasions. At least one (1) of these must be an event or a simulated event environment. Each of the following must be covered:
  - vehicle data
  - weather data
  - circuit data
  - driver/rider characteristics
- Retrieve data within relevant team quality and timeliness standards

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Work effectively with others
- Modify activities to cater for variations in workplace context and environment
- Follow team data security and confidentiality procedures at all times

Underpinning knowledge

- Data acquisition system channel requirements including the types, characteristics, uses and limitations of signal devices/sensors
- Methods for determining/calculating component rates and ratios
- Configuration, inspection and system checks of data acquisition systems
- Operation of data acquisition systems and the inputting of variables
- Data retrieval processes and techniques
- Data analysis principles, techniques and methodology including associated mathematical formulae
- Types of statistical representations of motorsport data, users of the data and their preferred format of data display
- Mathematical processes used to arrange data
- Data comparison methods including identifying trends and patterns, possible reasons for trends and patterns and potential solutions
- Data presentation methods including the use of data to support recommendations
- Data acquisition system fault diagnosis down to connection/component level
- Procedures for reporting equipment faults and data defects
- Workplace safety policies and procedures

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to data acquisition, team requirements, manufacturer/component supplier specifications, plans and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with team members, and the reporting of work outcomes and issues. (Level 2)
Plan and organise activities	Plan and organise activities including the coordination of data acquisition equipment, systems and material to avoid any back-tracking, work flow interruptions or inefficiencies. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the configuration of data acquisition systems and presentation of data. (Level 3)
Solve problems	Create and apply systematic problem solving techniques to anticipate changing information requirements or influences. (Level 2)
Use technology	Use technology related to the configuration and use of data acquisition systems, calculators, measuring devices and computing/computer aided systems. (Level 3)

EVIDENCE GUIDE

Resource implications

- Access to a data acquisition system, equipment and operating procedures as identified in the Range Statement

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines
- At least two assessments must occur at a motorsport event, or within a simulated event environment

AURM4415A Manage personal presentation and development

Unit descriptor

This unit covers the competency to manage personal presentation, learning and career options and develop personal conflict management skills, health and fitness requirements.

ELEMENT	PERFORMANCE CRITERIA
1. Establish personal presentation standards	1.1 Team expectations of personal presentation are identified
	1.2 Personal presentation requirements are related to role responsibilities
	1.3 Standards of personal presentation are determined
	1.4 Strategies to achieve personal presentation standards are devised and implemented
2. Determine potential career paths in motorsport	2.1 Personal strengths and opportunities for improvement are identified, development and implemented
	2.2 Personal attitudes needed to succeed in motorsport are identified
	2.3 Personal goals are reviewed and the relationship between personal goals and team goals is defined
	2.4 Career options within the team and outside the team are considered
	2.5 Potential career paths to achieve personal goals are identified
	2.6 Achievements and experience are documented in the form of a comprehensive resume/CV
3. Manage personal learning	3.1 Different learning styles are researched and personal preference in learning styles is determined
	3.2 Strategies to maximise the effectiveness of personal learning are developed
	3.3 The effect of preferred learning styles in the team environment are researched and applied
	3.4 Strategies are reviewed and modified if necessary
4. Develop personal health and fitness plan	4.1 Personal nutritional requirements for functioning in a motorsport environment are identified and applied
	4.2 Factors leading to stress and fatigue in a motorsport environment are identified and coping strategies are developed and applied

ELEMENT	PERFORMANCE CRITERIA
4. Develop personal health and fitness plan (continued)	4.3 Personal physical fitness requirements in relation to team role requirements are determined and applied
	4.4 The impact of legal and illegal drugs on personal competence and performance within a motorsport environment are identified and appropriate strategies applied and developed
	4.5 Health and fitness plan is reviewed and modified where appropriate
5. Establish personal conflict resolution strategies	5.1 Potential causes of conflict in relation to preferred learning style within the team environment are identified
	5.2 Personal strategies for dealing with conflict are determined and implemented
	5.3 Communication techniques are researched
	5.4 Strategies for improving communication with team members are devised and implemented

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves managing personal presentation, learning and career options and developing personal conflict management skills, health and fitness requirements
- Career planning includes researching personal expectations and potential career paths within and beyond the team including national and international opportunities. This includes career paths associated with the motorsport industry
- Managing personal learning includes research into different learning styles, determining personal preferences and consequently devising strategies to use these preferences to increase the effectiveness of personal learning
- Health includes principles of fitness in a motorsport environment, nutrition, the impact of legal and illegal drugs on body functioning and performance and stress management
- Conflict management strategies include those related to workshop and event environments

RANGE STATEMENT

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work requires individuals to demonstrate discretion, judgement and analysis skills in determining personal needs and preferences and evaluating personal input

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team policies and procedures relating to representing the team in public
- Team procedures relating to reporting and communication

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team standards and expectations
- Demonstrate personal presentation and conduct to team expectations for a minimum duration of one (1) day on at least three (3) occasions in motorsport environments including:
  - workshop
  - competition event
  - promotional activity

  Each environment must be covered at least once
- Produce a personal resume/CV which includes detailed statements of:
  - qualifications and training
  - experience in the motorsport industry
  - relevant experience beyond the motorsport industry
- testimony from employers, colleagues and/or training bodies

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Produce a personal health and fitness plan which includes detailed statements of:
  - a minimum of three (3) strategies for managing nutrition needs. Each strategy must demonstrate a knowledge of recommended nutritional intake
  - a minimum of three (3) strategies for increasing personal fitness. Strategies must address at least one (1) of flexibility, cardio-vascular fitness, muscular strength and endurance
  - a minimum of three (3) stress management strategies
- Develop a minimum of three (3) conflict resolution strategies, in situations which cover:
  - tight timelines or extended working hours
  - differing expectations
  - different working styles
  - personnel external to the team
- Working with and around other team members
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Team roles, responsibilities and relationships
- Motorsport sectors and categories
- Goal setting methods (e.g. SMART specific, measurable, achievable, realistic, timely)
- Personal presentation (including hair, clothes, personal hygiene, posture, body language and speech)
- Resume/CV development
- Learning styles and the impact of people with different learning styles working together in normal and pressure environments
- Positive and negative effects of personal attitudes in a motorsport environment
- Communication principles and techniques
- Group dynamics in high pressure environments

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Conflict management strategies and techniques
- Human nutritional requirements, food groups and their effect on the human body including specific nutritional requirements for functioning in a motorsport environment
- The impact of legal and illegal drugs on the human body and their implications in motorsport
- Principles of physical fitness and fitness requirement for functioning effectively in a motorsport environment

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to team roles and relationships, learning styles, health and nutrition, communication and conflict resolution. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable development of conflict management strategies and effective ways for working with other team members. (Level 2)
Plan and organise activities	Plan and organise activities including research into learning styles, career options, conflict management strategies, nutrition and physical fitness requirements. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise information flow and communication. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to estimate the financial and time wastage impact of inefficient working strategies. (Level 1)

EVIDENCE GUIDE

Solve problems	Use scenario planning techniques to assist in determining career choices, and knowledge of group dynamics to anticipate potential conflict situations and plan management strategies. (Level 3)
Use technology	Use the workplace technology to assist research and store information. (Level 1)

EVIDENCE GUIDE

Resource implications	• Access to job/role descriptions and documentation of team procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines • Assessment of this competency may include project related tasks and require portfolios or other forms of indirect evidence of process

AURM4416A Manage the preparation of a competition vehicle

Unit descriptor

This unit covers the work involved in researching competition vehicle assembly requirements, developing preparation specifications and checklists, developing preparation schedules and supervising competition vehicle preparation and post-preparation checks.

Prerequisites

AURM3402A Assemble and prepare a competition vehicle

ELEMENT	PERFORMANCE CRITERIA
1. Research information to develop preparation specifications and checklists	1.1 Regulatory body and category rules, supplementary regulations and component supplier specifications are used to develop task specifications and team instructions including design, quality, material, equipment, and quantities
	1.2 Regulations and specifications/tolerances are examined for competitive advantage
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 Job specifications are written containing steps and stages and are communicated to appropriate personnel
	1.5 Preparation checklists are produced
	1.6 Procedures are developed for minimising waste material
2. Develop preparation schedule	2.1 Equipment and personnel capabilities are assessed in terms of meeting job specifications
	2.2 Constraints to schedule are considered. These may include timing and location of upcoming event and equipment/component and personnel availability
	2.3 Optimum sequence for preparation is determined and documented
	2.4 Critical path and factors affecting that path are considered and documented
	2.5 Preparation schedule is produced and communicated to appropriate personnel

ELEMENT	PERFORMANCE CRITERIA
3. Supervise preparation	3.1 Implementation of preparation schedule is monitored
	3.2 Work area cleanliness and layout appropriate for job requirements is monitored
	3.3 Inspections for quality and readiness of components for installation are supervised
	3.4 Appropriate installation sequence and techniques are supervised
	3.5 Checks are made during and after installation to ensure accurate and complete fitting
	3.6 Problems with the work area and/or the operation of the equipment are evaluated and decision made
	3.7 Proposals for modifications/adaptation of equipment/components are evaluated and decisions made
4. Supervise post-preparation checks	4.1 Vehicle is inspected and any problems are identified and appropriately addressed
	4.2 Post assembly checks and vehicle start up are supervised
	4.3 Vehicle baseline setup is supervised
	4.4 Clean up of work area is supervised
	4.5 Recording of work/vehicle documentation is inspected for completion

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work includes researching competition vehicle assembly requirements, developing preparation specifications and checklists, developing preparation schedules and supervising competition vehicle preparation and post-preparation checks

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures

RANGE STATEMENT

Unit context (continued)

- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the management of competition vehicle preparation
- Competitive advantage may include, technical advantage, psychological advantage and promotional advantage

Preparation checklists

- Preparation checklists may include, but are not limited to:
  - assembly checklists
  - worksheets
  - pre-race/event checklists
  - pit lane checklists
  - post-race/event checklists

Tools and equipment

- Tools and equipment may include, but are not limited to:
  - hand tools
  - measuring devices
  - computers

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team/enterprise procedures relating to the preparation of competition vehicles
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team/enterprise procedures relating to reporting and communication
- Team/enterprise procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Australian Design Rules (where applicable)

RANGE STATEMENT

Information and procedures (continued)

- Motorsport/performance enhancement industry publications and electronic sources of information related to the preparation of competition vehicles

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly manage the preparation of a competition vehicle on at least two (2) occasions. Each of the following must be covered:
  - develop task specifications, preparation checklists and schedule
  - supervise competition vehicle preparation and post preparation checks
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Team requirements/job specifications, supplementary regulations and component supplier specifications including the examination of information for competitive advantage
- Resources availability, including competencies of individuals in the team/group
- Specification, checklist and schedule preparation
- Work area and component layout
- Inspection methods

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Assembly and preparation processes applicable to competition vehicles
- Problem solving techniques
- Supervision of OH&S
- Record keeping techniques

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Research, collect, organise and understand information related to competition vehicle assembly and preparation processes including the relevant technical, regulatory, environmental and safety requirements. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with technical supervisors, and other team members, and the reporting of work outcomes and resolution of problems. (Level 2)
Plan and organise activities	Plan and organise activities including the development of specifications, checklists and schedules and the coordination of personnel, equipment, systems and material to avoid any backtracking, work flow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise communication, workflow and productivity. (Level 3)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the management of the preparation of a competition vehicle. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Create and apply systematic problem solving techniques to anticipate problems, avoid reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to the management of assembly and preparation including tools, measuring devices, equipment, calculators and computers. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to competition vehicles and associated assembly tools in real or appropriately simulated situations involving the application of assembly techniques and the related computing, operational and inventory support systems This includes real or simulated work areas, material, equipment and information on work specifications, team requirements, organisation procedures, relevant safety procedures and regulations and quality standards
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM4417A Prepare competition vehicle suspension

Unit descriptor

This unit covers the competency to test, dismantle, inspect, reassemble and adjust competition vehicle suspension. This includes determining competition vehicle suspension requirements and the effects of making changes to variables.

Prerequisites

AUR16170A Service suspension systems

AUR16166A Repair suspension systems

ELEMENT	PERFORMANCE CRITERIA
1. Determine competition vehicle suspension requirements	1.1 Controlling body and category rules, supplementary regulations, component supplier specifications and team instructions are used to develop task specifications including design, quality, material, equipment, and quantities
	1.2 Regulations and specifications/tolerances are examined for competitive advantage
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 Specifications are checked for required operating conditions and clarification of specifications is sought where required
	1.5 Suspension requirements are calculated/determined according to known factors
	1.6 Component requirements are listed and communicated to appropriate persons
2. Prepare for work on suspension	2.1 Tools and equipment are identified and checked for safe and effective operation
	2.2 Work area is cleaned and laid out appropriately for job requirements
	2.3 Vehicle is cleaned and prepared for initial measurement
	2.4 Existing suspension settings are measured and documented prior to removal or adjustment of any components
	2.5 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons

ELEMENT	PERFORMANCE CRITERIA
3. Dismantle, repair/modify and assemble dampers	3.1 Methods for removing and dismantling damper/s according to team procedures and appropriate manuals/specifications are determined
	3.2 Damper/s are tested, dismantled, cleaned and tolerances/wear checked against manufacturer/ component supplier specifications
	3.3 Components are inspected for functioning and quality
	3.4 Decision to retain/replace/repair/ adjust/service component is determined according to team policies and procedures
	3.5 Repairs/modifications to dampers are carried out in accordance with manufacturer/component supplier specifications for methods, equipment and tolerances
	3.6 Dampers are re-oiled, bled, (and if necessary, re-gased) and bench tested
4. Dismantle, replace and/or change springs	4.1 Methods for removing and dismantling springs according to team procedures and appropriate manuals/specifications are determined
	4.2 Relevant dimensions are documented before disassembly
	4.3 Springs are disassembled, cleaned and rates/tolerances checked against specifications and retained or replaced according to team policies and procedures
	4.4 Replacement springs are tested for rate and wear
5. Configure suspension components/settings	5.1 Removed suspension components are inspected for quality and readiness for installation
	5.2 Appropriate installation sequence and techniques are used
	5.3 Sub-assemblies are installed and fasteners tensioned to manufacturer/component supplier specifications
	5.4 Checks are made during and after installation to ensure accurate and complete fitting
	5.5 Associated components, sub-assemblies or structural elements of vehicle that may affect suspension configuration are inspected for serviceability and repaired where necessary
	5.6 Suspension components/settings are configured as determined and within tolerances

ELEMENT	PERFORMANCE CRITERIA
5. Configure suspension components/settings	5.7 Settings are documented in accordance with team procedures
	5.8 Problems with the sub-assemblies are identified and reported to appropriate persons
6. Clean up work area and maintain records	6.1 Tools are maintained and returned to storage
	6.2 Surplus components/consumables are tagged and shelved/stored
	6.3 Surplus material is removed from work area
	6.4 Spillage from work area and vehicle is cleaned up
	6.5 Team/component supplier documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work involves testing, dismantling, inspecting, reassembling and adjusting competition vehicle suspension. This includes determining competition vehicle suspension requirements and the effects of making changes to variables
- Determining competition vehicle suspension requirements includes, but is not limited to, the following components:
  - springs
  - dampers
  - suspension/swing arms/joints
  - pivot locations/pickup points
  - lateral control devices
  - travel limiters
  - anti-roll bars
  - weight jackers
- Dismantling, repair/modification and assembly of dampers referred to in this unit applies only to non-sealed dampers. Manufacturer/component supplier safety recommendations must be observed at all times

RANGE STATEMENT

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in preparing competition vehicle suspension

Factors and calculations

- Known factors for determining suspension requirements may include, but are not limited to:
  - regulatory constraints
  - team budgetary constraints
  - load and speed characteristics
  - terrain and climate conditions
  - driver/rider preferences
- When determining suspension requirements calculations may include, but are not limited to:
  - wheel rate
  - spring rate
  - linkage/leverage ratios
  - spring pre-load
  - vehicle weight
  - sprung and unsprung weight
  - anti-roll bar rate
- Determinations can be confirmed through the use of shock dynamometer testing, track testing, and data analysis or software simulation

Tools and equipment

- Tools and equipment are to include component supplier specified tools and may include, but not be limited to, jacking equipment, measuring devices, hand tools, calculators, computers and data acquisition systems

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team/enterprise procedures relating to preparing competition vehicle suspension
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team/enterprise procedures relating to reporting and communication
- Team/enterprise procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
- achieve required outcomes within team time and quality standards

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Correctly prepare a competition vehicle suspension on a minimum of three (3) competition vehicles in situations which involve: (each of the following must be covered on at least two (2) vehicles):
  - calculations to determine spring rate and spring pre-load
  - determination of component selection within the constraints of the known factors
  - configuration of dampers and springs
  - adjustment of suspension components/settings
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment and within tolerances

Underpinning knowledge

- Team requirements/job specifications, supplementary regulations and component supplier specifications
- Competition vehicle suspension component types, function, applications, limitations and configuration considerations
- Suspension related calculations
- Safety related to repair of suspension components/assemblies
- Damper disassembly, inspection, repair/modification, assembly, re-oiling, bleeding, re-gasing and bench testing techniques
- Suspension components/settings configuration
- Record keeping techniques
- Procedures for reporting equipment faults and component defects
- Workplace guidelines regarding acceptable tolerance levels
- OH&S policies and procedures

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to preparing competition vehicle suspension including team requirements, manufacturer/component supplier specifications, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with supervisors, and other workers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the coordination of equipment, systems and material to avoid any backtracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the preparation of competition vehicle suspension. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate assembly problems, in order to work efficiently and effectively. (Level 2)

EVIDENCE GUIDE

Use technology

Use the workplace technology related to determining the requirements for the preparation of competition vehicle suspension including tools, measuring devices, equipment, calculators and computers.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to competition vehicles and associated assembly tools in real or appropriately simulated situations involving the application of repair/modification techniques and the related computing, operational and inventory support systems

  This includes real or simulated concepts, work areas, material, equipment and information on work specifications, team requirements, organisation procedures, relevant safety procedures and regulations and quality standards

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM4418A Select and prepare tyres and wheels for motorsport applications

Unit descriptor

This unit covers the competency to select and prepare tyres and wheels for motorsport applications to optimise handling performance. This includes consideration of tyre life, traction surface conditions and types.

ELEMENT	PERFORMANCE CRITERIA
1. Determine and select competition vehicle tyres and wheels	1.1 Controlling body and category rules, supplementary regulations, component supplier specifications and team instructions are used to develop task specifications including design, quality, material, equipment, and quantities
	1.2 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.3 Regulations and specifications/tolerances are examined for competitive advantage.
	1.4 Specifications are checked for required operating conditions and clarification of specifications is sought where required
	1.5 Tyre and wheel requirements are calculated/determined according to known factors
	1.6 Tyre and wheel assemblies are selected for application against requirements and are documented and reported to appropriate persons
2. Prepare work area and equipment	2.1 Tools and equipment are identified and checked for safe and effective operation
	2.2 Work area is cleaned and laid out appropriately for job requirements
	2.3 Problems with the work area and/or the operation of the equipment are identified and reported to appropriate persons
3. Mount tyre and wheel assembly to vehicle	3.1 Mounting surfaces and threaded components are cleaned/treated and checked for damage
	3.2 Tyre and wheel assemblies are selected from stock according to markings (i.e. scrutineers/category officials and/or team markings) and checked against criteria for next event

ELEMENT	PERFORMANCE CRITERIA
3. Mount tyre and wheel assembly to vehicle (continued)	3.3 Tyre and wheel assemblies are inspected for serviceability
	3.4 Tyre and wheel assemblies are fitted using appropriate mounting sequence and techniques
	3.5 Fastener(s) tensioned to team/component supplier specifications and fastener(s) locking device is/are engaged where fitted
	3.6 During and after installation checks are made to ensure accurate and complete fitting
	3.7 Problems with the tyre and wheel assemblies are identified and reported to appropriate persons
4. Conduct pre-race tyre and wheel preparation	4.1 Recommended start/cold pressures and optimum operating/hot pressures are obtained from tyre manufacturer
	4.2 Tyre inflation pressures are set to specifications
	4.3 Baseline tyre temperature, ambient and traction surface temperatures is measured and documented
	4.4 Tyres are buffed if specified
	4.5 Tyre warmers are fitted and turned on if specified (and if allowed in category rules)
5. Conduct post-race tyre and wheel maintenance	5.1 Tyre pressures and temperatures are checked at specified times and data documented
	5.2 Tyre contact surface is read for handling and wear indications and data documented
	5.3 Driver/rider is questioned for assessment of handling characteristics and data documented
	5.4 Additional data is sourced and determination made of changes (if any) required to tyres and wheels prior to next race
	5.5 Tyre contact surfaces are cleaned as determined
	5.6 Tyres are changed to different compound or pattern as determined
	5.7 Tyre pressures are changed as determined
	5.8 Removed tyres are tagged/marked for data audit trail

ELEMENT	PERFORMANCE CRITERIA
6. Clean up and complete documentation	6.1 Tyres are packed and stored
	6.2 Tyre and wheel stock inventory is assessed, documented and reported to appropriate person(s)
	6.3 Tools are maintained and returned to storage
	6.4 Team/component supplier documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work involves the selection and preparation of tyres and wheels used in motorsport applications to optimise handling performance including mounting wheels, conducting pre-race preparation and post-race maintenance and stock control and storage procedures
- For the purpose of this unit of competency, a race is defined as each of the items in a program such as a heat, final, test run, time trial, promotional ride etc. as distinct from a race meeting or event
- Inspection for serviceability includes checking wheel condition (damage or fatigue), valve body/pressure relief valves, ensuring inner surface of wheel is free from contaminants (e.g. oil/grease, water, dirt/gravel etc) and checking tyre condition for signs of damage, excessive wear, flat spots etc
- Competitive advantage may include technical advantage, psychological advantage or promotional advantage

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in the set up and operation of equipment

RANGE STATEMENT

Unit context (continued)

- Competency may be demonstrated in workplaces involved in the development and maintenance of competition vehicles or in a workplace simulated facility

Tools and equipment

- Tools and equipment may include, but not be limited to, pit lane/service area specified tools, lifting devices, air tools, torque wrenches, tyre hardness test instruments, air pressure gauges, tyre buffers and cleaners, tyre heaters, pyrometers and hand tools

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team/enterprise procedures relating to selecting and preparing tyres and wheels for motorsport applications
- Task instructions including work sheets, check lists and plans
- Team/enterprise procedures relating to reporting and communication
- Team/enterprise procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for tyres and wheels
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Correctly select and prepare tyres and wheels for a competition vehicle on a minimum of two (2) vehicles in situations which involve a variety of weather conditions, track conditions and driver/rider requirements
- Compliance with tyre and wheel manufacturer/component supplier recommendations for use
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations, component supplier specifications (e.g. wheel size, application and pressures both cold and hot) and team requirements/job specifications
- Wheel and tyre types, manufacturer/component supplier markings, function, application and limitations including specifications, handling characteristics and manufacturer/ component supplier recommendations for use
- Tyre and wheel serviceability inspection techniques
- Reading tyres for handling and wear indications
- Driver/rider debriefing
- Tyre temperature testing
- Tyre measurement including stagger calculations
- Tyre buffing, cleaning and warming
- Tyre and wheel storage methods
- Markings (i.e. scrutineers/category officials and/or team markings)
- Record keeping techniques
- Procedures for reporting equipment faults and component defects
- OH&S policies and procedures

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to selecting and preparing tyres and wheels for motorsport applications, team requirements, manufacturer/component supplier specifications and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with supervisors, and other workers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the coordination of equipment, systems and material to avoid any backtracking, work flow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the selection and preparation of tyres and wheels for motorsport applications. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate assembly problems, in order to work efficiently and effectively. (Level 2)
Use technology	Use the workplace technology related to torquing and fastening including tools, equipment, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to competition vehicles and associated assembly tools in real or appropriately simulated situations involving the application of selection and preparation techniques and the related computing, operational and inventory support systems

  This includes real or simulated concepts, work areas, material, equipment and information on work specifications, customer requirements, organisation procedures, relevant safety procedures and regulations and quality standards

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM4419A Test engines using a dynamometer

Unit descriptor

This unit covers the competency to test engines using a dynamometer. This includes dynamometer set up, testing, data logging and analysis, devising strategies for improvement and dynamometer shutdown procedures.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for dynamometer operation	1.1 Team instructions, controlling body rules, category rules and component supplier specifications are used to determine job requirements including design, quality, material, equipment, and specification
	1.2 OH&S requirements including equipment and system isolation requirements, extraction, fire hazard, fuel storage, scatter shields, noise regulations, environmental regulations and personal protection needs are observed throughout the work
	1.3 Outcomes of dynamometer testing are determined and documented
	1.4 Dynamometer is checked for calibration and serviceability and prepared for operation
	1.5 Engine is connected to dynamometer including ancillary systems and monitoring/control systems
	1.6 Exhaust extraction is connected and checked for serviceability
	1.7 Engine is prepared for dynamometer testing including checking oil and water levels and confirming engine tune and condition
2. Conduct dynamometer testing	2.1 Load and run sequence is determined including run-in period for new engines
	2.2 Correction factors are determined/calculated and applied to results
	2.3 Engine connections and security to the dynamometer are checked
	2.4 The selected dynamometer testing sequence is performed in accordance with specifications and directions and/or the locally authorised method
	2.5 Dynamometer test data is analysed and valid conclusions about engine and sub-system condition and performance are made

ELEMENT	PERFORMANCE CRITERIA
2. Conduct dynamometer testing (continued)	2.6 Findings including recommendations for engine configuration and/or modifications to improve performance based on dynamometer data are reported to appropriate persons
	2.7 Approved modifications are tested with confirmation run/s
	2.8 Data is presented to appropriate team members as information to complement engine/vehicle set-up
3. Clean up work area and log test results	3.1 Dynamometer shutdown procedure is performed in accordance with manufacturer/component supplier requirements
	3.2 Engine is disconnected from dynamometer
	3.3 Dynamometer and associated tools and equipment are cleaned and refurbished
	3.4 Operator level maintenance of dynamometer is conducted
	3.5 Dynamometer test results are logged to create/add to engine history

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work includes the use of a dynamometer to test engine performance and the interpretation of dynamometer results in order to maximise engine performance for the motorsport/performance enhancement environment. This includes dynamometer set up, testing, use of software relevant to the dynamometer, data logging and analysis, and dynamometer shutdown procedures
- Dynamometers include either engine or chassis dynamometers. Dynamometers may include water or electrically loaded dynamometers
- Units of measurement are to include metric and imperial units

RANGE STATEMENT

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in the set-up and operation of machines
- Competency may be demonstrated in workplaces involved in the design, development, manufacture and maintenance of performance vehicles and/or performance vehicle components and assemblies used in motorsport

Tools and equipment

- Tools and equipment include, but may not be limited to, engine dynamometer or chassis dynamometer, hand and power tools, engine compression test kit, vacuum/pressure gauges, flow meters, exhaust analysers, engine diagnostic computer hardware and software

Personal protective equipment

- Personal protective equipment is to include that prescribed under dynamometer manufacturer/component supplier specifications, legislation, regulations and enterprise policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team/enterprise procedures relating to testing engines using a dynamometer
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team/enterprise procedures relating to reporting and communication
- Team/enterprise procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly set up, and operate an engine dynamometer to test a minimum of two (2) engines to complete the following:
  - determine engine performance
  - analyse engine performance data
  - assess effect of engine/sub-system changes and present to appropriate team members as information to complement engine/vehicle set-up
  - confirm effectiveness of engine/sub-system modifications
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Engine performance and dynamometer terminology
- Preparation procedure for dynamometer testing
- Dynamometer operation and use of associated hardware and software
- Test environment correction factors
- Dynamometer data interpretation and analysis
- Operator level dynamometer maintenance

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Procedures for reporting task completion
- OH&S policies and procedures

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise, understand and analyse information related to dynamometer test results, team requirements and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements, coordination of work with technical supervisors, other technicians and team members, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the obtaining of equipment and material to avoid any backtracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurement of engine performance. (Level 2)
Solve problems	Use dynamometer testing to solve problems with engine performance. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology	Use the workplace technology related to dynamometers including tools, equipment, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications	• Access to tools and equipment as identified in the Range Statement including engines, dynamometer and testing equipment and relevant technical references or information
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM4420A Test suspension dampers using a dynamometer

Unit descriptor

This unit covers the competency to test suspension dampers using a dynamometer. This includes dynamometer set up, use of software relevant to the dynamometer, testing, data logging and analysis, devising strategies for improvement and dynamometer maintenance procedures.

Prerequisites

MEM2.13C5A Perform mathematical computations

MEM2.9C10A Perform computer operations

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for dynamometer operation	1.1 Team instructions, category regulations and component supplier specifications are used to determine job requirements including design, quality, material, equipment, and specification
	1.2 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.3 Outcomes of dynamometer testing are determined and documented
	1.4 Dynamometer is checked for calibration and serviceability and prepared for operation
2. Conduct dynamometer testing	2.1 Load and run sequence is determined and test parameters are determined/calculated/measured
	2.2 Dampers are connected to dynamometer and damper security to the dynamometer is confirmed
	2.3 The selected dynamometer testing sequence is performed in accordance with specifications and directions and/or the locally authorised method
	2.4 Dynamometer test data is analysed and valid conclusions about damper condition and performance are made
	2.5 Findings including recommendations for damper configuration and/or modifications to improve performance based on dynamometer data are reported to appropriate persons
	2.6 Approved modifications are tested with confirmation run/s
	2.7 Data is presented to appropriate team members as information to complement suspension setup

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and log test results	3.1 Dynamometer shutdown procedure is performed in accordance with manufacturer/component supplier requirements
	3.2 Damper is disconnected from dynamometer
	3.3 Dynamometer and associated tools and equipment are cleaned and refurbished
	3.4 Operator level maintenance of dynamometer is conducted
	3.5 Dynamometer test results are logged to create/add to damper history

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work includes the use of a dynamometer to test suspension damper performance, the interpretation of dynamometer results in order to maximise damper performance for the motorsport/performance enhancement environment. This includes dynamometer set up, use of the software relevant to the dynamometer, data recording and dynamometer maintenance procedures
- Test parameters may include, but are not limited to:
  - ambient and damper temperature
  - damper stroke and frequency
  - sample rates
- Units of measurements are to include metric and imperial units

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements

RANGE STATEMENT

Unit context (continued)	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in the set-up and operation of machines • Competency may be demonstrated in workplaces involved in the design, development, manufacture and maintenance of performance vehicles and/or performance vehicle components and assemblies used in motorsport
Tools and equipment	• Tools and equipment may include, but not be limited to, damper dynamometer, hand and power tools, diagnostic computer hardware and software
Personal protective equipment	• Personal protective equipment is to include that prescribed under dynamometer manufacturer/component supplier specifications, legislation, regulations and enterprise policies and practices
Information and procedures	• Controlling body rules, category rules and supplementary regulations • Team/enterprise procedures relating to testing suspension dampers using a dynamometer • Task instructions including work sheets, check lists, plans, drawings and designs • Team/enterprise procedures relating to reporting and communication • Team/enterprise procedures relating to the use of tools and equipment • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Australian Design Rules (where applicable)

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly set up, and operate a damper dynamometer to test a minimum of three (3) different dampers (of at least two (2) different types/brands) to complete the following:
  - determine damper performance
  - analyse damper performance data
  - assess effect of damper changes and present to appropriate team members as information to complement suspension setup
  - confirm effectiveness of damper set-up modifications
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Suspension damper and dynamometer terminology
- Preparation procedure for dynamometer testing
- Dynamometer operation and use of associated hardware and software
- Test environment correction factors
- Dynamometer data interpretation and analysis
- Damper modification and adjustment procedures

EVIDENCE GUIDE

underpinning knowledge (continued)

- Operator level dynamometer maintenance
- Procedures for reporting task completion
- OH&S policies and procedures

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise, understand and analyse information related to dynamometer test results, team requirements and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements, coordination of work with technical supervisors, other technicians and team members, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the obtaining of equipment and material to avoid any backtracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurement of suspension damper performance. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate test problems, in order to work efficiently and effectively. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology Use the workplace technology related to dynamometers including associated software and hardware, tools, equipment, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to tools and equipment as identified in the Range Statement, dampers, dynamometer and testing equipment and relevant technical references or information

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURM5421A Apply aerodynamic and vehicle dynamic principles and effects to competition vehicles

Unit descriptor

This unit covers the competency to determine aerodynamic and vehicle dynamic requirements of competition vehicles, devise improvement strategies, apply changes and test results.

Prerequisites

AURM4418A	Select and prepare tyres and wheels for motorsport applications
AURM4417A	Prepare competition vehicle suspension
MEM2.13C5A	Perform mathematical computations

ELEMENT	PERFORMANCE CRITERIA
1. Determine optimum tyre settings	1.1 Controlling body rules, category rules, supplementary regulations, manufacturer/component supplier specifications and team/enterprise requirements are used to identify setting requirements
	1.2 Regulations and specifications/tolerances are examined to determine competitive advantage (technical, psychological and/or promotional advantage)
	1.3 OH&S requirements including personal protection needs are observed throughout the work
	1.4 Specifications are checked for required operating conditions and clarification of specifications is sought where required
	1.5 Tyre setting requirements are calculated/determined according to known factors
	1.6 Selected tyre settings effects on overall vehicle performance are evaluated
	1.7 Anticipated performance improvement is quantified and optimum settings are documented
2. Determine optimum steering and suspension settings	2.1 Controlling body and category rules, supplementary regulations, component supplier specifications and team/enterprise requirements are used to establish settings
	2.2 Regulations and specifications/tolerances are examined to determine competitive advantage (technical, psychological and/or promotional advantage)
	2.3 Specifications are checked for required operating conditions and clarification of specifications is sought where required

ELEMENT	PERFORMANCE CRITERIA
2. Determine optimum steering and suspension settings (continued)	2.4 Steering and suspension setting requirements are calculated/determined according to known factors
	2.5 Selected steering and suspension settings effects on overall vehicle performance are evaluated
	2.6 Anticipated performance improvement is quantified and optimum settings are documented
3. Determine optimum aerodynamic device settings	3.1 Controlling body rules, category rules, supplementary regulations, component supplier specifications and team/enterprise requirements are used to establish settings
	3.2 Regulations and specifications/tolerances are examined for competitive advantage (technical, psychological and/or promotional advantage)
	3.3 Specifications are checked for required operating conditions and clarification of specifications is sought where required
	3.4 Aerodynamic device setting requirements are calculated/determined according to known factors
	3.5 Selected aerodynamic device settings effects on overall vehicle performance are evaluated
	3.6 Anticipated performance improvement is quantified and optimum settings are documented
4. Supervise the configuration of aerodynamic and vehicle dynamic settings	4.1 Tools and equipment are checked for safe and effective operation
	4.2 The configuration of aerodynamic and vehicle dynamic settings is supervised
	4.3 During and after configuration checks are made to ensure accurate and complete changes
	4.4 Problems with the work area and/or the operation of the equipment are evaluated and decisions implemented
	4.5 Proposals for modifications/adaptation of equipment/components are evaluated and implemented
	4.6 Work area cleanliness and layout appropriate for job requirements is monitored

ELEMENT	PERFORMANCE CRITERIA
5. Test aerodynamic and vehicle dynamic settings	5.1 Test procedures are determined
	5.2 Settings are tested against anticipated performance improvement
	5.3 Testing procedure and results are documented
	5.4 Recommendations for settings usage are devised, and implemented where appropriate

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work involves determining aerodynamic and vehicle dynamic requirements of competition vehicles, devising improvement strategies, applying changes and test results. It includes terminology, principles and effects of the physics involved in resistance and motion

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the application of aerodynamic and vehicle dynamic principles and effects to competition vehicles

Tyre settings

- Tyre settings include, but are not limited to:
  - construction and compound
  - size (including stagger)
  - pressure/s
  - loading/s
  - temperatures

RANGE STATEMENT

Steering and suspension settings

- Steering and suspension settings include, but are not limited to:
  - wheel rate and linkage/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/out, camber and caster
  - roll centres
  - ride height
  - centre of gravity

Aerodynamic settings

- Aerodynamic settings include, but are not limited to:
  - wing angles, height and location
  - body panels and fittings
  - ground effects/ride height
  - frontal areas
  - lift reduction/ drag reduction
  - downforce generation
  - downforce/drag compromise

Known factors for determining suspension requirements

- Known factors for determining suspension requirements include, but are not limited to:
  - regulatory constraints
  - budgetary constraints
  - load and speed characteristics
  - terrain and climate conditions
  - driver/rider preferences

Tools and equipment

- Tools and equipment are to include component supplier specified tools and may include, but are not limited to, jacking equipment, measuring devices, tyre pressure and temperature gauges, hand tools, calculators, computers and data acquisition systems

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and team/enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team/enterprise procedures relating to applying aerodynamic and vehicle dynamic principles and effects to competition vehicles
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team/enterprise procedures relating to reporting and communication
- Team/enterprise procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Australian Design Rules (where applicable)
- Motorsport/performance enhancement industry publications related to aerodynamic and vehicle dynamic principles

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team/enterprise requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Correctly determine and supervise the configuration of optimum aerodynamic and vehicle dynamic settings on a minimum of two (2) occasions. Each of the following must be covered:
  - tyre settings
  - steering and suspension settings
  - aerodynamic device settings
- Appropriate test procedures are selected and correctly conducted
- Document test results and compare to anticipated performance improvements
- Manage time efficiently
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations relating to establishing settings
- Terminology, principles and effects of the physics involved in resistance and motion
- Manufacturer/component supplier specifications and team/enterprise instructions relating to establishing settings
- Aerodynamic and vehicle dynamic principles and their effect on competition vehicles
- Competition vehicle test methods and procedures including record keeping methods
- Mathematical computations to determine optimum settings
- Team/enterprise guidelines regarding acceptable tolerance levels
- OH&S policies and procedures

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Research, collect, organise and understand information related to the application of aerodynamic and vehicle dynamic principles and effects to competition vehicles including the relevant technical, regulatory, environmental and safety requirements. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with supervisors, and other workers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the coordination of equipment, systems and material to avoid any backtracking, work flow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the application of aerodynamic and vehicle dynamic principles and effects to competition vehicles. (Level 3)
Solve problems	Create and apply systematic problem solving techniques to anticipate problems, avoid reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to determining the requirements for the application of aerodynamic and vehicle dynamic principles and effects to competition vehicles including tools, measuring devices, equipment, calculators and computers.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to competition vehicles and associated assembly tools in real or appropriately simulated situations involving the application of repair/modification techniques and the related computing, operational and inventory support systems

  This includes real or simulated work areas, material, equipment and information on work specifications, team/enterprise requirements, organisation procedures, relevant safety procedures and regulations and quality standards

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines
- Assessment of this competency may include project related tasks and require portfolios or other forms of indirect evidence of process
- Direct evidence will include endorsement of final outcome/product by team/enterprise management or authorisation for use by a competent authority

AURM5422A Determine material suitability for competition vehicle component construction

Unit descriptor

This unit covers the competency to determine material suitability for competition vehicle component construction. It includes determining component performance specifications, researching component operating environment, establishing material specifications for component and testing material suitability.

Prerequisites

AURM3405A	Conduct non-destructive testing
MEM2.13C5A	Perform mathematical computations

ELEMENT	PERFORMANCE CRITERIA
1. Establish component performance specifications	1.1 Regulatory body and category rules, supplementary regulations, component supplier specifications and team instructions are used to develop component specifications including design, quality, materials, equipment, and quantities
	1.2 Component operating function is confirmed
	1.3 Component operating environment is established
	1.4 Component performance specifications are prepared
	1.5 OH&S requirement including equipment and system isolation requirements and personal protection needs are observed throughout the work
2. Establish material performance specifications	2.1 Material operating function is confirmed
	2.2 Criteria to be used in the selection of materials and in the evaluation of outcomes are identified and documented
	2.3 Benchmark specifications for materials are accessed and interpreted
	2.4 Possible legal and safety impacts of the material chosen are considered and responded to in accordance with regulatory and team obligations and practices
	2.5 Material performance specifications are prepared and documented to industry and team standards
3. Test material suitability against material performance specifications	3.1 Materials capable of undertaking the operating function are identified
	3.2 The proposed material is selected following the identification, consideration and evaluation of the full range of available and relevant options

ELEMENT	PERFORMANCE CRITERIA
3. Test material suitability against material performance specifications (continued)	3.3 The selected option, including material choices and processes, is developed in detail and progressively validated against established criteria
	3.4 Material compatibility is confirmed
	3.5 Materials are selected/constructed to component specification
	3.6 Test materials are listed against material performance specifications
	3.7 Material failure causes are identified
	3.8 Testing procedures and results are documented
	3.9 Recommendations for material usage are devised
4. Test component suitability against component performance specifications	4.1 Component test procedures are determined
	4.2 Component is tested against component performance specifications
	4.3 Testing procedures and results are documented
	4.4 Recommendations for component usage are devised

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- Work involves determining material suitability for competition vehicle component construction, establishing the components and their base material performance specifications and testing of these against performance specifications
- This includes the production of new components from a design or existing components from a new material
- Components include, but are not limited to competition vehicle structural (e.g. brackets, braces, roll cages, tubs/cockpits/hulls etc) and operating components (linkages, suspension components, drive train components etc)

RANGE STATEMENT

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem solving skills in the management of competition vehicle preparation

Materials

- Materials may include, but not be limited to metals (including alloys) and composite materials (plastics, fibreglass/carbon/kevlar based materials) which may be single material or combination materials

Tools and equipment

- Tools and equipment may include, but are not limited to:
  - hand tools
  - fabrication equipment
  - measuring devices
  - testing devices
  - calibration or measuring and testing devices
  - computers and relevant software

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Regulatory body and category rules
- Trade and professional journals, reports and electronic sources of information
- Team procedures relating to documentation, reporting, testing, calibration and communication
- Component supplier specifications and assembly procedures
- Testing equipment supplier specifications

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Correctly apply and use safety equipment and personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Correctly determine material suitability for a minimum of two (2) competition vehicle components. At least one (1) component must be made from metal and one (1) from a composite material. Each of the following must be covered:
  - the selection, development and recording of material and component performance specifications and evaluation criteria before undertaking component production and testing
  - the selection, development and validation of component production methodology, process(es) and specification
  - the application of the component production specification and testing against predetermined criteria
  - the recording and reporting of outcomes
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Regulatory body and category rules and component supplier specifications
- Possible legal and safety impacts of material selection
- Molecular structure of material
- Physical properties of fabrication materials and composites of these materials

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Chemical properties of fabrication materials and composites of these materials
- Material treatment processes
- Causes of fabrication material degradation
- Mechanical properties of fabrication materials and composites of these materials
- Appropriateness of testing procedures to material characteristics being sought
- Materials and component testing procedures, both destructive and non-destructive
- Problem solving techniques
- Supervision of OH&S
- Record keeping methods
- Associated manufacturer/component supplier policies and procedures

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Research, collect, organise and understand information related to material suitability for competition vehicle components including the relevant technical, regulatory, environmental and safety requirements. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with supervisors, and other workers, and the reporting of work outcomes and resolution of problems. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the development of specifications, checklists and schedules and the coordination of personnel, equipment, systems and materials to avoid any back-tracking, work flow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise communication, workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate specifications, calibrate and establish testing equipment and evaluate test results against pre-established criteria. (Level 3)
Solve problems	Create and apply systematic problem solving techniques to anticipate problems, avoid reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to the management of assembly and preparation including tools, measuring devices, equipment, calculators and computers. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to competition vehicles and associated assembly tools in real or appropriately simulated situations involving the application of assembly techniques and to the related computing, operational and inventory support systems
- Access to suitable and appropriate materials, testing equipment and fabrication equipment to confirm component appropriateness

  This includes real or simulated work areas, materials, equipment and information on work specifications, customer requirements, organisation procedures, relevant safety procedures and regulations and quality standards

EVIDENCE GUIDE

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, materials, work instructions and deadlines

AURM5423A Manage motorsport operations

Unit descriptor

This unit covers the competency to manage motorsport operations. It includes motorsport team leadership, decision making, ensuring team compliance with motorsport regulatory requirements and managing logistics and resourcing.

ELEMENT	PERFORMANCE CRITERIA
1. Lead team members in undertaking tasks	1.1 Models of leadership are researched and appropriate model(s) applied
	1.2 Personal leadership preferences, strengths and weaknesses are identified and strategies developed to enhance leadership
	1.3 Team goals are developed in consultation with team members and documented
	1.4 OH&S requirements including personal protection needs are observed throughout the work
	1.5 Tasks are delegated, monitored and feedback on performance of tasks given
	1.6 Team member performance reporting and review mechanisms are developed and implemented
2. Apply decision making strategies	2.1 Information is gathered from a variety of sources and team members are consulted as appropriate to the situation
	2.2 All information is considered in determining options
	2.3 The most appropriate option, given the team circumstances and goals, is chosen
	2.4 Decisions are communicated to relevant team members
	2.5 Decisions are reviewed and modifications made where required
3. Supervise team compliance with regulatory body requirements	3.1 Regulatory body requirements are interpreted
	3.2 Instructions for team members are developed and implemented
	3.3 Relevant team members are briefed
	3.4 Regulatory body officials are liaised with

ELEMENT	PERFORMANCE CRITERIA
4. Plan resources for team operations	4.1 Team resource and equipment requirements are researched and documented
	4.2 Resource needs are prioritised and matched to team budget and priorities are confirmed (or modified if appropriate) after consultation with relevant team members
	4.3 Resource and equipment suppliers are identified and confirmed
	4.4 Procurement plan with prioritised purchasing is devised, and resources are procured accordingly
5. Plan logistics for team operations	5.1 Operational work plans including role responsibilities, timeframes and milestones are developed
	5.2 Operations are checked to ensure optimum use of human and physical resources
	5.3 Operational plans are implemented and relevant team members briefed as to roles and responsibilities
	5.4 Operational plans are documented and amended in accordance with team procedures and expectations
6. Evaluate operational processes	6.1 Operational progress is closely monitored against required quality of work and adherence to both budget and time schedule and reported to appropriate personnel in accordance with team requirements
	6.2 Opportunities for preventative or corrective changes are identified using outcomes of monitoring activity or feedback from team members
	6.3 Preventative or corrective action is recommended and implemented where appropriate
	6.4 Changes are communicated to relevant personnel in a logical and easily understood manner
	6.5 Changes are monitored to confirm improvement to team efficiency
	6.6 Adequate records are maintained of all key information pertaining to operational processes in accordance with team requirements

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope	• Work involves managing team operations and may include but is not limited to workshop management, specific event preparation management, innovation and component management • Operational resources include personnel, equipment and machinery, material and consumables, and infrastructure
Unit context	• OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures • Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in consultation with team members, decision making and planning • Competency may be demonstrated in workplaces involved in motorsport, associated with motorsport teams or in a simulated environment
Tools and equipment	• Tools and equipment may include a computer and project management, database and logistics management software
Procurement	• Procurement planning includes normal quantity supply (minimum and maximum holding) and matching storage facilities and appropriate material handling equipment • Procurement includes dissemination of material safety data sheets or other supplier safety information to relevant personnel, identification of relevant engineering controls or personal protection equipment and any additional resources required for safe workplace handling and storage. These are documented and managed according to team procedures and legislative requirements

RANGE STATEMENT

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team/enterprise procedures relating to applying specific operational areas as identified in the unit scope
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team/enterprise procedures relating to reporting and communication
- Team/enterprise procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications, material safety data sheets and application procedures for equipment and material
- Australian Design Rules (where applicable)
- Existing team budgets and inventories where appropriate

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment and material handling equipment
- Implement and supervise task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Complete the development of a significant operational procedure incorporating legislative safety requirements and covering:
  - a full analysis of the topic area
  - a step-by-step operational procedures
  - supporting documents to the procedure

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Implement a process for an operational area as identified in the unit scope which covers:
  - information dissemination and
  - monitoring of operations
- Complete a review and update of a process for an operational area as identified in the unit scope which covers:
  - system and sub-area/sub-system description
  - evaluation of the effectiveness of the process in achieving desired outcomes
  - legal, regulatory and/or intellectual property law requirements
  - documentation of modifications to improve the process
- Complete work within relevant team budgetary, quality and timeliness standards
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations
- Leadership models
- Goal development (e.g. SMART - specific, measurable, achievable, realistic and timely)
- Delegation strategies
- Information gathering strategies (including Internet and library searching and networking)
- Analytical tools (e.g. critical path, cause and effect, pro/con, forcefield, pareto and strength, weakness, opportunity and threat (SWOT) analyses, decision trees)
- Decision making and models and techniques
- Operational plan development
- Logistics and procurement management techniques
- Process engineering techniques and systems
- Material handling techniques and options

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Equipment and machines to be used to achieve business outcome
- Business processes used in workplace
- Resource availability, including competencies of individuals in the team

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to team resource and logistic requirements, legislative and motorsport regulatory requirements from a variety of sources, using a range of research techniques. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable relevant input from team members, and understanding by team members of plans developed. (Level 3)
Plan and organise activities	Plan and organise activities including consultation with team members to determine team resource and logistic requirements and development, implementation and review of operational plans. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise information flow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly interpret budgets and estimate material requirements required for team resource and logistic requirements. (Level 2)

EVIDENCE GUIDE

Solve problems	Use information gathering, analysis and evaluative techniques to determine team resource and logistic requirements and develop appropriate strategies to address these. (Level 3)
Use technology	Use the workplace technology related to computer software programs for gathering and recording information including Internet search, spreadsheets and databases. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to relevant team budgets and inventories as identified in the Range Statement and team procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines • This unit may be undertaken under the guidance of a mentor in the workplace (e.g. team manager), where tasks are undertaken, but ultimate responsibility rests with the mentor • Assessment of this competency may include project related tasks and require portfolios or other forms of indirect evidence of process

AURM5424A Manage motorsport team development

Unit descriptor

This unit covers the competency to manage motorsport team development. It includes fostering team work ethic and morale, conflict management and identifying health requirements of team members.

ELEMENT	PERFORMANCE CRITERIA
1. Develop and implement team roles and responsibilities	1.1 Team roles and responsibilities in the workshop and event environment are determined and documented
	1.2 Role descriptions are written in conjunction with relevant team members
	1.3 Authority hierarchies are identified and related to team roles, and joint responsibilities are determined and documented
	1.4 OH&S requirements including personal protection needs are observed throughout the work
	1.5 Team members are briefed, roles implemented and modifications to role descriptions are made where necessary
2. Develop and foster motorsport team work ethic and image	2.1 Team image, philosophy and goals are defined through consultation with team members and promotion partners and documented
	2.2 Information on team goals, image and attitudes is disseminated to team members
	2.3 Personal attitudes needed to succeed in motorsport are identified
	2.4 Strategies to support team members to reflect desired team image are developed
	2.5 Team standards of behaviour, commitment and presentation are defined and expectations communicated to team members
	2.6 Team members are briefed on how their decisions and actions are consistent with team image, goals and personal goals philosophy
	2.7 Maintenance of work ethic and image is encouraged, monitored and corrected where necessary

ELEMENT	PERFORMANCE CRITERIA
3. Develop and implement team member health and fitness policy	3.1 Basic nutritional requirements for personnel operating in a motorsport environment are researched and documented
	3.2 Event catering procedures suitable for the team are developed and documented
	3.3 Strategies for coping with stress and fatigue are developed, communicated to team members and monitored
	3.4 Physical fitness requirements of team members in relation to role requirements are developed, communicated to team members and monitored
	3.5 The impact of drugs on personal competence within a motorsport environment is communicated to team members and monitored
4. Apply conflict resolution strategies	4.1 Opportunities for team members to discuss problems which directly or indirectly affect their work are regularly provided
	4.2 Potential and actual conflict situations are recognised and appropriate assistance is sought to resolve the conflict with the personnel involved in accordance with team procedures
	4.3 Options for resolution of the conflict are identified which allow for constructive responses to be negotiated and enable established work relationships to continue
	4.4 The dispute/conflict is managed to optimise the likelihood of a favourable outcome for all parties and is in line with team goals
	4.5 The strategy selected for resolution is consistent with team practices/procedures
	4.6 Resolution and counselling skills appropriate to the situation are applied where necessary
	4.7 Outcomes meet individual, enterprise and legislative requirements
	4.8 Where records of the conflict and outcomes are kept, they are accurate, complete and comply with organisational requirements and are stored securely, only accessible to authorised personnel

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves consulting and working with team members to develop a shared understanding of roles and responsibilities, team goals, work ethic and image, support team member health and fitness and to apply conflict resolution strategies
- Teams may be small (4 or less people), medium (5-15 people) or large (more than 15 people). The team context includes roles less central to the team operations. These include team owner, promotion partners and advertising/publicity personnel
- Team roles may be highly differentiated or team members may perform multiple roles within the team

Unit context

- OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Competency may be demonstrated in motorsport team workplaces, a simulated environment, or workplaces of enterprises supporting and working closely with motorsport teams

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Current team role/job descriptions
- Task instructions including work sheets, check lists, plans, drawings and designs
- Team procedures relating to reporting and communication
- Team procedures relating to the use of tools and equipment
- Manufacturer/component supplier specifications and application procedures for tools, equipment and material
- Team advertising/promotional/and promotion partner material

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment
- Implement and supervise task instructions, operating procedures to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Write role descriptions for all team members. These are to include:
  - tasks (and sub-tasks where appropriate)
  - responsibilities for outcomes
  - relevant responsibilities for tools, equipment and material
  - relevant responsibilities for personnel
  - relevant responsibilities for systems
  - accountability
  - relationships with other team members
- Develop at least three (3) conflict resolution strategies. As a minimum they are to contain:
  - rationale for choice in relation to the team environment
  - examples of scenarios where they could be implemented
  - a list of strengths and weaknesses
- Complete all work within relevant team quality and timeliness standards
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Team roles, responsibilities and inter-relationship of roles
- Leadership styles and decision-making models
- Personal and work attitudes desired by the motorsport sector
- Positive and negative potential of different personal attitudes in a motorsport environment
- Positive and negative potential between team and personal goals
- Ways in which individual team members can promote or negatively impact on desired team image
- Human nutritional requirements, the five food groups and their effect on the human body
- Specific nutritional requirements for operating in a motorsport environment
- Impact on the human body of using legal and illegal drugs and implications for a motorsport team
- Principles of physical fitness, and fitness requirements to operate in a motorsport environment
- Group dynamics in stressful environments
- Communication principles and techniques
- Causes of conflict
- Conflict resolution models and strategies

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to team roles and relationships, image and goals, nutrition and physical fitness of team members.

(Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of team roles and relationships, work ethic and team image expectations and standards and communicating with team members to resolve conflict. (Level 3)
Plan and organise activities	Plan and organise activities including professional development of team members regarding team goals and image, health and fitness requirements, stress management and conflict resolution strategies. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise information flow and communication. (Level 3)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to assist research, analysis and presentation of information. (Level 1)
Solve problems	Use scenario planning techniques and knowledge of group behaviour and team dynamics to anticipate potential conflict situations and plan and implement resolution strategies. (Level 3)
Use technology	Use the workplace technology to assist research, storage and presentation of information. (Level 1)

EVIDENCE GUIDE

Resource implications	• Access to job/role descriptions and advertising/ promotional material as identified in the Range Statement and documentation of team procedures

EVIDENCE GUIDE

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with access to a motorsport team
- Assessment of this competency may include project related tasks and require portfolios or other forms of indirect evidence

AURM5425A Manage motorsport team media liaison

Unit descriptor

This unit covers the competency to identify team media requirements and limitations, prepare media information, issue media information, arrange media interviews and evaluate publicity benefits.

ELEMENT	PERFORMANCE CRITERIA
1. Identify team media requirements and limitations	1.1 Desired outcomes of media liaison are identified in relation to team goals
	1.2 Limitations on information to be provided are identified in accordance with team requirements, confidentiality, ethical conduct and sponsor requirements
	1.3 Media liaison budget is developed
	1.4 Media outlets and personnel are researched, and choices made according to team requirements, ethical conduct and promotion partner requirements
2. Prepare media information	2.1 Media selected is suitable for promotional strategy and team requirements
	2.2 Specific media outlet information needs are researched
	2.3 Media needs/requests are considered in light of team objectives, confidentiality requirements and ethical issues
	2.4 Team information and performance statistics are researched and documented
	2.5 Information prepared is clear, succinct and appropriate to target audience
	2.6 Information prepared meets team and media outlet needs and industry ethics
3. Issue media information	3.1 Appropriate media personnel are contacted and release timing arrangements made
	3.2 Team management approval is obtained and information provided to media outlet
	3.3 Promotion partner representatives are advised of release details where appropriate
4. Arrange media interviews	4.1 Appropriate media personnel are contacted and requirements negotiated
	4.2 An interview schedule and agenda is determined
	4.3 Material for the interview is researched and prepared

ELEMENT	PERFORMANCE CRITERIA
4. Arrange media interviews (continued)	4.4 Appropriate team personnel are briefed, and coached in presentation techniques where required
	4.5 Team management are regularly informed of arrangements and outcomes
	4.6 Promotion partner representatives are advised of interview details where appropriate
5. Evaluate publicity benefits	5.1 Exposure statistics are obtained from media outlets
	5.2 Promotion partner feedback on media release/interview is obtained
	5.3 Relevant data and feedback is analysed to assess effectiveness
	5.4 Outcomes are measured against media liaison budget and team objectives

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves all aspects of liaising with the media on behalf of a motorsport team, and supporting other team members with media interviews and appearances. It includes researching the media liaison needs of the team and the most appropriate media outlets and preparation of a budget to support media liaison activities
- Research of team media needs includes clarification of team goals and objectives with relevant team members, identification of promotional partner expectations and consideration of ethical issues in advertising and promotion
- Media may include
  - print (local, community, daily newspapers, magazines, industry publications)
  - television
  - radio (mainstream, community)
  - Internet
- Media releases include information prepared for dissemination through print (e.g. newspaper, magazine) and electronic (e.g. radio, television, Internet) media

RANGE STATEMENT

Unit scope (continued)

- Media interviews may include but are not limited to radio, television and Internet video clip interviews
- Promotion partners include existing or potential partners that are an external individual or organisation, which provides financial or in-kind support to a motorsport team. Promotion partners may also be termed ‘sponsors’ or ‘business partners’
- Promotional activities and follow-up includes liaison with media, promotional partners/sponsors and dissemination of team performance

Unit context

- OH&S requirements include relevant state and commonwealth legislation, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, manual handling procedures and insurance requirements
- Tasks requires individuals to demonstrate discretion, judgement and problem-solving skills in the development of media releases and arrangement of media interviews
- Competency may be demonstrated in a motorsport team workplace, a simulated environment, or workplaces of enterprises supporting and working closely with motorsport teams

Resources

- Resources may include but are not limited to a computer and word processing software

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team procedures relating to dissemination of information and media appearances
- Task instructions including work sheets, check lists and plans
- Team procedures relating to reporting and communication
- Legislation regarding ethical advertising

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - achieve required outcomes within team time and quality standards
- Develop media releases for a minimum of three (3) types of media.
- Arrange a minimum of two (2) media appearances for team personnel. Appearances are for two types of media, which may include:
  - radio
  - television
  - 'live' appearance at an event
  - guest speaker
- Conduct all work to relevant quality and timeliness standards
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations
- OH&S requirements, including relevant state and commonwealth legislation
- Ethical advertising legislation and code of practice
- Communication principles and techniques
- Presentation techniques
- Media content requirements
- Interview techniques

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to media, team and promotion partner publicity requirements. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable effective team appearances and information dissemination. (Level 3)
Plan and organise activities	Plan and organise activities including team member media appearances. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to setup scheduling and operate budget. (Level 2)
Solve problems	Use knowledge of scenario planning, logistics and differing requirements to meet team, promotion partner and media outlet needs. (Level 2)
Use technology	Use the workplace technology, including facsimiles, phones and computer software related to planning and information presentation. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to controlling body rules, category rules and supplementary regulations and relevant legislation as identified in the Range Statement

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines
- Assessment of this competency may include project related tasks and require portfolios or other forms of indirect evidence of process

AURM5426A Manage motorsport team promotional partnerships and marketing

Unit descriptor

This unit covers the competency to determine opportunities and requirements in relation to marketing the team and attracting and managing promotional partnerships.

ELEMENT	PERFORMANCE CRITERIA
1. Research team marketing opportunities and promotion partner requirements	1.1 Team strengths, weaknesses, opportunities and threats are identified, analysed and documented
	1.2 Team members and other relevant parties are consulted where appropriate and specialist marketing advice is sought where necessary and opportunities/requirements are documented
	1.3 Promotion partner requirements are researched and documented
	1.4 Principles, policies and strategic direction of the team are identified and documented to enable marketing effort to be focused
	1.5 OH&S requirements including personal protection needs are observed throughout the work
2. Devise and implement a team marketing strategy	2.1 Promotion strategies emphasising team strengths are analysed with team members
	2.2 The legal, ethical and environmental constraints of the market are identified and their effect on marketing objectives determined
	2.3 Appropriate promotion strategies are researched and a marketing strategy including measurable performance targets is developed and documented
	2.4 Risk management strategies are developed and documented
	2.5 Relevant team members are briefed on their roles and responsibilities
3. Prepare promotion partnership proposals	3.1 Team funding/sponsorship amount and type required is determined
	3.2 Appropriate networks for funding/sponsorship are researched and developed in line with the policies, aims and objectives of the team

ELEMENT	PERFORMANCE CRITERIA
3. Prepare promotion partnership proposals (continued)	3.3 Potential promotion partners are identified on the basis of supporting the principles and policies of the organisation and approached with the aim of forming a promotional partnership
	3.4 Potential promotion partner requirements are researched and documented
	3.5 Benefits to the promotion partner are identified and documented
	3.6 Information regarding opportunities and benefits is prepared in a professional format and distributed to potential promotion partners
4. Present to promotion partners	4.1 Follow-up is conducted with appropriate promotion partner personnel to arrange meeting details
	4.2 Presentations and supporting material specific to the potential promotion partners are prepared
	4.3 Introductory/supporting material is forwarded prior to the meeting
	4.4 Meeting with potential promotion partner is attended and presentation is conducted in an appropriate format
	4.5 Follow-up information is supplied where appropriate
5. Coordinate promotion partnership activities	5.1 Written contracts/agreements are made with the promotion partner to include full details of the commitments made by both parties
	5.2 Team members are briefed on details and commitments of promotional partnership arrangements
	5.3 Activities are organised in accordance with promotion partnership agreement and all agreements made are honoured
	5.4 Activities are monitored and evaluated in terms of team and promotion partner objectives
	5.5 Feedback is provided to and requested from promotion partner
	5.6 Payments from promotion partners and other contract formalities are monitored and actioned

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope	• Work involves determining opportunities and requirements in relation to marketing the team and attracting and managing promotional partnerships • Promotion partners include existing or potential partners that are an external individual or organisation, which provides financial or in-kind support to a motorsport team. Promotion partners may also be termed 'sponsors' or 'business partners' • Teams may have more than one promotion partner. There may be one major or exclusive promotion partner and/or a number of smaller promotional partners
Unit context	• OH&S requirements include relevant state and commonwealth legislation, safety management systems, controlling body requirements, manufacturer/component supplier specifications and safe operating procedures • Work is carried out in accordance with legislative obligations (including environmental requirements), relevant health regulations, and insurance requirements • Tasks requires individuals to demonstrate discretion, judgement and problem solving skills in researching opportunities and devising strategies • Competency may be demonstrated in a motorsport team workplace, a simulated environment, or workplaces of enterprises supporting and working closely with motorsport teams
Resources	• Resources may include a computer and wordprocessing, presentation and spreadsheet software
Information and procedures	• Controlling body rules, category rules and supplementary regulations • Team policies and procedures on client relations • Contracted promotion partner requirements • Task instructions including work sheets, check lists and plans

RANGE STATEMENT

Information and procedures (continued)

- Team procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for presentation material
- Team policies and procedures relating to confidentiality and protection of intellectual property

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - achieve required outcomes within team time and quality standards
- Prepare and present a minimum of two (2) promotion proposals. Each proposal is to include, as a minimum:
  - a profile of the team and relevant members
  - relevant team achievements
  - proposed partnership arrangements
  - marketing strategy
  - benefits to promotion partner
- Conduct all work to relevant quality and timeliness standards
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations
- OH&S requirements, including relevant state and commonwealth legislation, safety management systems and safe operating procedures
- Legislation and codes of practice relating to ethical advertising
- Intellectual property and copyright principles and practices
- Communication principles
- Marketing plan development
- Presentation techniques

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to :
Collect, analyse and organise information	Collect, organise and understand information related to market information and promotion partner/s. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable effective presentation of proposals and strategies. (Level 3)
Plan and organise activities	Plan and organise activities including proposal and strategy presentation. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly determine financial requirements and benefits. (Level 2)
Solve problems	Use knowledge of group dynamics, scenario planning and the motorsport industry to appropriately match team and potential promotion partner requirements. (Level 2)
Use technology	Use the workplace technology related to planning and presentation including computer software. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to controlling body rules, category rules and supplementary regulations and relevant legislation as identified in the Range Statement
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines • Assessment of this competency may include project related tasks and require portfolios or other forms of indirect evidence

AURM5427A Manage team pit lane/service area operations

Unit descriptor

This unit covers the competency to plan, coordinate and oversee the operations of a motorsport team technical service crew during an event. It includes pit lane/service area operations, emergency repairs and coordination of competition vehicle on-track support, personnel and team communication.

Prerequisites

AURM3409A Perform pit lane/service area operations

ELEMENT	PERFORMANCE CRITERIA
1. Develop pit lane/ service area management plan	1.1 OH&S requirements including personal protection needs are observed throughout the work
	1.2 Controlling body rules, category rules and supplementary regulations requirements are checked and implemented
	1.3 Required tools and equipment are identified and checklists developed
	1.4 Competition vehicle on-track support strategies are devised and documented
	1.5 Team member responsibilities are determined and communicated
	1.6 Task timings are determined, documented and communicated
	1.7 Communication strategy is developed and team members briefed
	1.8 Team work area and equipment security procedures are developed and team members briefed
	1.9 Contingency plan is developed and documented
2. Inspect pit lane/service area operation readiness	2.1 Pit lane/service area layout is devised and implemented
	2.2 Equipment and tool checks for operation, positioning, and compliance with team specifications, controlling body rules, category rules, supplementary regulations and OH&S requirements are supervised
	2.3 Correct positioning of competition vehicle stop and service markings are checked

ELEMENT	PERFORMANCE CRITERIA
3. Supervise technical service crew	3.1 Team members are briefed on their responsibilities, task timings, category rule and supplementary regulations requirements, OH&S and environmental legislative requirements and security procedures prior to the event
	3.2 Responsibilities and tasks are reviewed with team members at the event site
	3.3 Communications equipment is allocated and communication strategy is reviewed with relevant team members
	3.4 Pit lane/service area operations are supervised and work is controlled
	3.5 Safe working environment and practices are monitored and corrected
	3.6 Emergency repairs on competition vehicle are supervised and decision on re-entering event given
	3.7 Checks with all team members are made regularly during the event
4. Coordinate competition vehicle on-track support	4.1 Technical advice is provided to driver/rider during competition and additional information is sought should clarification be required
	4.2 Competition related information and strategy is communicated to the driver/rider and relevant team members during competition
	4.3 Records of race and team performance are maintained
	4.4 Liaison with event officials is conducted when appropriate
5. Supervise post-event operations	5.1 Team members are supervised to ensure post-event impoundment procedures are followed as per controlling body rules, category rules and/or supplementary regulations
	5.2 Supervise the dismantling of pit lane/service area
	5.3 Clean up of work area is supervised
	5.4 Disposal of waste material is supervised to ensure compliance with local requirements, environmental and OH&S regulations
	5.5 Team/event documentation is completed

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope	• Work involves planning, coordinating and overseeing the operations of a technical service crew during an event. It includes pit lane/service area operations, emergency repairs and coordination of competition vehicle on-track support, personnel and team communication • Pit lane/service area is defined as the area where the team technical support crew works on the competition vehicle during an event and includes the pit bay
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with environmental legislation, relevant health regulations and team procedures • Work requires individuals to demonstrate discretion, judgement and problem solving skills in the development of the pit lane/service area management plan and contingency strategies, supervision of team members and inspection of the pit lane/service area • Competency must be demonstrated at and during a motorsport event
Tools and equipment	• Tools and equipment may include, but are not limited to pneumatic wrenches, boom and hoses, gas cylinders, jacks, jacking safety locks, smash repair equipment, spare components, cleaning equipment, fuel churns and refuelling equipment, fuel spill equipment, brake piston retraction tool, lifting devices and/or stands and boat launch equipment (winches, trailers, lifting slings and decanting equipment)
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices, including heat-proof gloves, enclosed shoes and long trousers

RANGE STATEMENT

Information and procedures

- Team procedures relating to pit lane/service area operation, team member roles, confidentiality and security
- Controlling body rules, category rules and supplementary regulations relating to pit lane/service area operations
- Environmental, hazardous chemical and dangerous goods legislation and local requirements relating to the disposal and use of fuels, lubricants, coolants and cleaning agents

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the use of personal protective equipment and material handling equipment
- Implement and supervise task instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage to competition vehicle or equipment
  - achieve required outcomes within team time and quality standards
- Develop and implement a pit lane/service area management plan, which covers:
  - minimisation of risk of injury to self and others
  - minimisation of the risk of damage to competition vehicle, tools and equipment and wastage of material
  - minimisation of the service and emergency repair times
  - addresses potential problems
- Supervise team members effectively
- Modify activities to cater for variations in context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Controlling body rules, category rules and supplementary regulations
- Controlling safe working practices in a pit lane/service area
- Pit lane/service area operational tasks
- Communication principles
- Group dynamics principles
- Effective supervision techniques
- Scenario and logistics planning
- Critical path analysis
- Operational plan development

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to category rules and supplementary regulations, pit lane/service area operational tasks, legislative and team requirements to develop contingency strategies and a pit lane/service area management plan. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable team compliance with the pit lane/service area management plan and procedures. (Level 3)
Plan and organise activities	Plan and organise activities including pit lane/service area operations to avoid workflow interruptions, competition vehicle damage, injury or time wastage. (Level 3)

EVIDENCE GUIDE

Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 3)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly gauge task timing, material requirements, vehicle stop markings and equipment and tools positioning. (Level 2)
Solve problems	Use scenario planning, critical path analysis and logistics planning techniques to accommodate workflow, positioning, storage and work sequencing requirements. (Level 3)
Use technology	Use the workplace technology related to planning and logistics including computer hardware and software. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to category rules and supplementary regulations and relevant legislation as identified in the Range Statement, team procedures and past performance data
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment must occur at and during a motorsport event

AURV3802A Carry out sewing operations

Unit descriptor This unit covers the competency to carry out sewing operations including hand and machine operation.

Prerequisite AURV2803A Carry out minor sewing repairs and alterations

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for sewing are selected and inspected for quality
	1.5 Correct hand and tools are inspected for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out hand and machine sewing procedures	2.1 Procedures are applied without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 All sewing procedures are carried out in accordance with manufacturer/component supplier specifications
	2.4 All sewing procedures are completed within established industry/enterprise guidelines
	2.5 All activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Carry out sewing machine maintenance procedures	3.1 Procedures are carried out without causing damage to any component/system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 All cleaning procedures are carried out to manufacturer/component supplier and enterprise guidelines
	3.4 All lubricating procedures are carried out to manufacturer/component supplier and enterprise guidelines

ELEMENT	PERFORMANCE CRITERIA
3. Carry out sewing machine maintenance procedures (continued)	3.5 All activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Waste and scrap is removed following workplace procedures
	4.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	4.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	4.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Carry out sewing operations	• Sewing of material and maintenance of machines
Unit scope	• Work involves hand sewing, machine sewing, matching of material, measuring, cutting, over locking. Methods should be applied under normal operating conditions
Unit context	• OH&S requirements include building codes, safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in sewing, material matching, measuring, cutting and maintaining machinery
	• Competency may be demonstrated in workplaces involved in trim shops

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include hand and power tools and sewing machines and may include, but not be limited to: scissors, needles, knives, straight edge, tape and square making chalks

Material

- Material are to include trim cloth, canvas, plastic sheeting, leather

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment.
- Work instructions, including job sheets, material safety data sheets and instructional material
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret job sheets, instructional material, trim datasheets to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - Minimise the risk of injury to self and others
  - Prevent damage and wastage of goods, equipment and products
  - Maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Identify, set up, operate and maintain sewing equipment and procedures to complete the following
- Conduct operator maintenance sewing machines
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment.

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Relevant technical information
  - Equipment operation and safety requirements
  - Relevant manufacturer/component supplier and company policies
  - Personal safety requirements
  - Material matching procedures
  - Machine sewing procedures
  - Sewing methods appropriate to various material types
  - Machine maintenance procedures
  - Planning sewing operations and machine maintenance processes and techniques
  - Characteristics of material and uses of products produced for use in motor vehicles recreational vehicles, marine, aircraft, heavy vehicle, plant and agricultural equipment
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels to manufactures, enterprise and customer requirements
  - Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to sewing operations and machine operations, work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 3)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 3)
Use technology	Use the workplace technology related to sewing of material including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to manufacturer/component supplier specification as identified in the Range Statement, standard operating procedures, instructional information and job sheets

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURCR20051A Work effectively with others

Unit descriptor

This unit covers the competency to organise self, to perform tasks, to behave responsibly and to work effectively as a member of a work group or team.

Element	Performance Criteria
1. Contribute to the determination of appropriate work roles	1.1 Work roles for each group or team member are identified based on information and instructions about objectives, performance requirements and procedures. 1.2 Contributions are made to assist in the determination of the appropriate roles and responsibilities for the successful completion of work activities.
2. Contribute to the planning of activities	2.1 Suggestions and information are provided as appropriate to contribute to the planning of work activities and associated procedures.
3. Organise and accept responsibility for own workload	3.1 Priorities and deadlines are established in consultation with others (as appropriate) and documented. 3.2 Work activities are planned and progress of work is communicated to others whose personal work plans and timelines may be affected. 3.3 Work is completed to the standard expected in the workplace and in accordance with any guidelines, directions and instructions. 3.4 Variations and difficulties affecting work requirements are identified through regular reviews and action is taken to report these issues to appropriate personnel. 3.5 Additional support to improve work is communicated clearly to appropriate personnel.
4. Maintain enterprise dress and grooming standards	4.1 Enterprise and/or industry dress standards and requirements are maintained. 4.2 Enterprise and/or industry grooming standards are maintained.
5. Work with others	5.1 Forms of communication appropriate to the work activities are used. 5.2 Assistance in the completion of the activities is requested where appropriate. 5.3 Support is provided to colleagues to ensure designated team goals are achieved.

Element		Performance Criteria	
5.	Work with others (continued)	5.4	Contributions to the achievement of a required outcome are made.
		5.5	Work is undertaken in accordance with specified procedures on an individual and shared basis as appropriate.
		5.6	Problems are discussed and resolved where possible through agreed and accepted processes.
		5.7	Suggestions for improvements to process are made and discussed within the team.
6.	Participate in identifying and meeting own development needs	6.1	The competencies for the workplace are identified.
		6.2	Organisational structure, career paths and development opportunities appropriate to the workplace are identified.
		6.3	Steps are taken, in consultation with appropriate personnel, to identify own learning needs through assessment and planning for future work requirements.
		6.4	Appropriate opportunities to learn and develop required competencies are undertaken including establishing networks and working relationships with others.
7.	Work effectively and responsibly	7.1	Notification of shift/work availability or non-attendance for shift/work is given without undue delay and according to enterprise policies and procedures.
		7.2	Staff rosters are interpreted accurately.
		7.3	Non-discriminatory attitudes are displayed when interacting with customers, staff and management.
		7.4	Non-discriminatory language is used consistently.
		7.5	Relevant awards/enterprise agreements are identified and interpreted accurately.

Range of Variables

Enterprise

Enterprises may vary in size, type and location, in the range of work activities conducted, hours of operation and in the number and type of staff.

Sources of information

These may include enterprise policies and procedures relating to organisational structure, work roles and responsibilities, career paths, work standards, dress and grooming standards, work objectives and performance requirements.

Legislative requirements
This may include legislation or regulations in relation to OH&S, equal opportunity, anti-discrimination, consumer law, trade practices and fair trading and industrial relations.

This may also include industry codes of practice.

Awards/Agreements
These may include relevant State and Federal industry awards and enterprise or workplace agreements.

Customers
Customers may be regular or new, internal or external, and may include people from a range of social, cultural or ethnic backgrounds and physical and mental abilities.

Staff
Staff may be full-time, part-time or casual and vary in terms of staff training and in staffing levels, eg. staff shortages. Staff may be operating in routine or busy trading and may include people from a range of social, cultural or ethnic backgrounds and physical and mental abilities.

Staff may work in teams or groups of varying size and structure.

Communication
Communication may include face to face, telephone, written or electronic means.

Activities
Activities may include normal or routine work requirements or additional/non-routine work requirements.

Evidence Guide

Critical aspects
It is essential that competence in this unit signifies the ability to transfer the competency to changing circumstances and to respond to unusual circumstances in the critical aspects of:

- organising and accepting responsibility for own workload
- following the designated work plan for the job
- contributing to collective planning, cooperative work and effective outcomes
- cooperating with others to complete work-oriented activities
- participating in identifying and meeting own development needs
- consistently applying enterprise and/or industry standards of dress and grooming
- consistently and responsibly applying enterprise policies and procedures in regard to workplace ethics, including interpretation of staff rosters, notification of availability for work and allocated duties/job description
- consistently applying enterprise policies and procedures and legislative requirements in regard to non-discriminatory language and attitudes
- knowing own rights and responsibilities in regard to awards/enterprise agreements.

Interdependent assessment of units
This unit may be assessed in conjunction with other units that form part of the job role or function.

Underpinning knowledge

- General knowledge of enterprise work procedures.
- General knowledge of group dynamics and the impact of working effectively with others on individual and group performance.
- General knowledge of enterprise work systems, equipment, management and facility operating systems.
- Operational knowledge of enterprise policies and procedures and legislative requirements in regard to:
  - workplace ethics
  - work availability or non-attendance
  - staff rosters
  - dress and grooming
  - discriminatory behaviour
  - harassment
  - equal opportunity
  - staff counselling and disciplinary procedures.
- Operational knowledge of relevant industry awards or enterprise/workplace agreements.
- Underpinning Skills Plain English literacy and communication skills in relation to reading and understanding workplace documents.
- Basic analytical, problem solving, negotiation and conflict management skills in relation to working with others.

Consistency in performance

It is preferable that assessment reflect a process rather than an event and that it occurs over a period of time to cover the varying circumstances. Evidence of performance may be provided by clients, team leaders/members or other appropriate persons subject to agreed authentication arrangements.

Context for assessment

The elements of competency contain both knowledge and practical components. The knowledge components may be assessed off the job. The practical components should be assessed on the job or in a realistically simulated work environment.

Evidence is best gathered using the products, processes and procedures of the individual workplace context as the means by which the candidate achieves industry competencies.

Resource implications

The following are required:

- a workplace or simulated workplace
- relevant documentation, such as enterprise or sample policies and procedures manuals related to ethics, employee and employer rights and responsibilities, dress and grooming, discrimination, job descriptions and organisation charts
- relevant legislation such as equal employment opportunity, equal opportunity and anti-discrimination
- enterprise or sample awards and/or enterprise/workplace agreements
- a qualified workplace assessor.

Key Competencies and Application to Standards

	Level 1	2	3
Collecting, analysing and organising information	•		
Communicating ideas and information	•		
Planning and organising activities	•		
Working with others in teams	•		
Using mathematical ideas and techniques	•		
Solving problems	•		
Using technology	•		

AURCR20900A Contribute to quality work outcomes

Unit descriptor

This unit covers the competency for individual involvement in the achievement of quality work outcomes and environmental compliance throughout Aftermarket work activities.

Element	Performance Criteria
1. Plan and prepare for quality work outcomes	1.1 Relevant quality procedures are identified from site/enterprise and team quality requirements. 1.2 Performance indicators for individual work are identified and agreed with the appropriate persons. 1.3 Work plans and processes which facilitate the achievement of quality work outcomes are adopted.
2. Comply with environmental requirements	2.1 Environmental requirements for the work are interpreted and considered as a factor in work planning/preparation. 2.2 Environmental monitoring and control procedures are implemented during the work processes. 2.3 Environmental incidents and potential problems are identified and responded to or referred to others in accordance with site requirements.
3. Achieve and maintain quality work outcomes	3.1 Responsibility for monitoring quality of outputs is accepted and changes implemented by the individual, as necessary, in accordance with site procedures. 3.2 Performance indicators are monitored, adjusted and agreed to meet changing circumstances and satisfied. 3.3 Loss and damage incidents are minimised by monitoring work processes, reporting incidents and applying local risk control processes. 3.4 Procedural improvements and/or recommendations are communicated to the relevant people.

Range of Variables

Quality procedures

May be contained in site quality system documentation, work instructions, safe work procedures, product specifications, equipment maintenance schedules, technical procedures and adopted or specifically prepared standards.

Sources of information/documents
Vehicle manufacturer/component supplier specifications, enterprise operating procedures, supplier directories, parts catalogues, customer orders and industry/workplace codes of practice, material safety data sheets (MSDS) and hazchem.

Legislative requirements
This includes state and territory legislation related to OH&S and Australia Design Rules.

Performance indicators
Are to account for issues of time, quantity, quality and cost factors and may include establishing time targets for own work, identifying reasonable criteria for evaluating own work outcomes, identifying measures to avoid wastage, identifying reasonable criteria to judge internal and/or external customer satisfaction and identifying processes to ensure a 'right first time' approach.

Environmental requirements
Are those established under law and by the enterprise and coverage may include dust, water quality, waste water management, chemicals handling, noise/vibration, fuel/oil handling and disposal, waste management and rehabilitation.

Environmental control measures
May include chemical management, dust suppression, water treatment, waste water processes, application of materials, compliance with noise/vibration standards and application of waste disposal procedures.

Environmental reports and records
May include complaints register and incidental reporting procedures.

Resources
May include stationery, forms, business documents, job cards, internal memoranda, file notes.

Loss and damage incidents
May include personal injury, loss and damage of plant, equipment and material.

Communications
Communications may be verbal, written, by telephone or by other means.

Evidence Guide

Critical aspects
It is essential that competence in this unit signifies the ability to transfer the competency to changing circumstances and to respond to unusual circumstances in the critical aspects of:

- communicating effectively with others in associated areas
- identifying quality procedures and needs
- identifying individual performance indicators
- monitoring and adjusting performance indicators to meet changing circumstances
- satisfying performance indicators
- applying environmental control systems
- processing recommendations for change.

Interdependent assessment of units
This unit may be assessed in conjunction with other common or technical units which form part of a work role.

Underpinning knowledge
- General knowledge of quality systems in a workplace.
- General knowledge of typical loss and damage control systems.
- General knowledge of environmental legislative framework and environmental licence provisions.
- General knowledge of work planning processes.
- Working knowledge of OH&S requirements, equipment, material and personal safety requirements processes at the worksite.
- Working knowledge of enterprise quality systems and processes.
- Working knowledge of site environmental procedures and key constraints.
- Working knowledge of site environment control measures.

Underpinning skills
- Research and interpretative skills to locate, interpret and apply relevant operational quality and environmental information.
- Questioning and active listening skills, for example when obtaining information of quality and environmental working practices.
- Plain English literacy and communication skills in relation to dealing with others involved in the work.
- Technical literacy and communication skills sufficient to interpret and apply common industry terminology, and interpret symbols used for quality and environmental signage.
- Basic problem solving skills to assess quality and environmental issues.

Consistency in performance
It is preferable that assessment reflects a process rather than an event and that it occurs over a period of time to cover the varying work process circumstances. Evidence of performance may be provided by customers, team leaders/members or other appropriate persons subject to agreed authentication arrangements.

Context for assessment
Assessment of this unit must be completed on-the-job or in a realistically simulated work environment which reflects a range of quality processes and procedures.

Resource implications
The following are required:
- a workplace or simulated workplace
- realistic situations requiring quality and environmental working practices
- site or equivalent instructions on quality and environmental working practices
- hazardous chemicals information (and/or dangerous goods if applicable)
- appropriate material, tools and equipment.

Key Competencies and Application to Standards

	Level 1	Level 2	Level 3
Collecting, analysing and organising information	•		
Communicating ideas and information	•		
Planning and organising activities	•		
Working with others in teams	•		
Using mathematical ideas and techniques	•		
Solving problems	•		
Using technology	•		

AURCT20200A Operate information technology systems

Unit descriptor

This unit covers the competency to the use and application of enterprise information technology systems. It requires knowledge of the hardware and software in use, and the ability to enter, retrieve and use information.

Element	Performance Criteria
1. Use enterprise information technology system	1.1 Knowledge of the enterprise information technology system(s) is accurately demonstrated and conveyed to other staff members. 1.2 Hardware is accurately identified and operated according to manufacturer/component supplier specifications and enterprise procedures. 1.3 Software, including databases, menus and Electronic Data Interchange (EDI), is accurately identified and used according to manufacturer/component supplier specifications and enterprise procedures. 1.4 Application and uses of software available is accurately identified and used according to enterprise procedures. 1.5 Data is transmitted according to EDI procedures. 1.6 Keyboard skills are used accurately to enter information by enterprise policies. 1.7 Back up procedures are regularly performed according to enterprise procedures.
2. Edit/update information	2.1 Information to be edited/updated is correctly identified according to enterprise procedures. 2.2 Information on system is accurately edited/updated according to enterprise procedures.
3. Solve problems	3.1 Equipment/hardware/software faults are identified and rectified where possible or expert assistance sought without delay. 3.2 Maintenance program for hardware and software systems are monitored and implemented according to manufacturer/component supplier specifications and enterprise procedures. 3.3 Routine problems are handled using appropriate problem solving techniques and referred to appropriate personnel. 3.4 Assistance is positively and actively provided to staff as problems arise.

Range of Variables

Enterprise
Enterprises may vary in size, type and location and in their range of products and services.

Information technology systems
Systems used may be centrally based, location based or networked. Systems may be loaded/downloaded electronically or manually. Communications may be by network or by the internet.

Types of software may include menus, databases or EDI.

Equipment
This may include a range of personal computers and computer terminals, which may be stand alone or networked.
Information technology equipment may also include scanning equipment, bar coding equipment, point of sale terminals and pricing equipment.

System problems
These may relate to hardware faults, breakdowns, software faults or staff abilities/training. Problems may be solved by routine procedures, manufacturer/component supplier recommendations, lateral thinking or referral to a specialist/expert.

Sources of information
These may include enterprise policies and procedures in regard to information technology systems.
These may also include OH&S requirements, particularly in regard to use of screen based equipment, and may also include industry codes of practice.

Staff
Staff may be full-time, part-time or casual and vary in terms of staff training, in staffing levels, eg. staff shortages and in the range of responsibilities for information technology systems. Staff may be operating in routine or busy trading conditions.

Information
Information to be entered may include staffing information, customer details/records including names, addresses and profiles, stock records, stock transfers, orders, delivery details.

Evidence Guide

Critical aspects
It is essential that competence in this unit signifies the ability to transfer the competency to changing circumstances and to respond to unusual circumstances in the critical aspects of:

- consistently applying enterprise policies and procedures in regard to information technology systems, including resolution of systems faults and accessing/entering information on the enterprise systems
- following requirements of relevant legislation requirements.

Interdependent assessment of units
This unit may be assessed in conjunction with other units that form part of the job role or function.

Underpinning knowledge

- Operational knowledge of enterprise policies and procedures in regard to use of enterprise information technology systems, including:
  - use and maintenance of hardware and software systems
  - solutions to problems/breakdowns
  - operation of equipment.
- Operational knowledge of relevant legislation requirements for OH&S, including use of screen-based equipment.

Underpinning skills

- Plain English literacy skills in regard to interpreting documentation and completing reports or documents.
- Problem solving skills related to hardware and software problems.
- Technical skills in the operation of enterprise information technology hardware and software and the use, application and operation of relevant databases, menus and EDI.

Consistency in performance

It is preferable that assessment reflect a process rather than an event and that it occurs over a period of time to cover the varying circumstances. Evidence of performance may be provided by customers, team leaders/members or other appropriate persons subject to agreed authentication arrangements.

Context for assessment

The elements of competency contain both knowledge and practical components. The knowledge components may be assessed off the job. The practical components should be assessed on the job or in a realistically simulated work environment.

- Evidence is best gathered using the products, processes and procedures of the individual workplace context as the means by which the candidate achieves industry competencies.

Resource implications

The following are required:

- a workplace or simulated workplace
- relevant documentation, such as enterprise policies and procedures manuals relating to information technology systems, legislation requirements, industry codes of practice, hardware and software manuals
- information technology systems
- a qualified workplace assessor.

Key Competencies and Application to Standards

	Level 1	Level 2	Level 3
Collecting, analysing and organising information		•	
Communicating ideas and information		•	
Planning and organising activities		•	
Working with others in teams		•	
Using mathematical ideas and techniques		•	
Solving Problems		•	
Using technology		•	

AURT2800A Remove, repair and refit tyres and tubes (plant machinery)

Unit descriptor

This unit covers the competency to required to remove and refit tyres and tubes from wheel rims, inspect tyres and tubes to assess repairability and perform minor tyre and tube repairs.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including safety cages, personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Remove and refit/ replace tyres and tubes	2.1 Removal and refitting/replacement of tyres and tubes is achieved without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications.
	2.3 Identify, locate and purge toxic fill substances according to OH&S requirements and manufacturer/component supplier specifications
	2.4 Removal and refitting/replacement is to be carried out according to manufacturer/component supplier specifications for methods, fasteners, tools and equipment used and tolerances relevant to the component/assembly
	2.5 Appropriate workplace documentation is completed and dealt with relevant to removal and refitting/replacement outcomes
	2.6 All removal and refitting/replacement activities are carried out according to industry regulations/guidelines, OH&S legislation, legislation and enterprise procedures/policies

ELEMENT	PERFORMANCE CRITERIA
2. Remove and refit/replace tyres and tubes (continued)	2.7 Company liability in relation to tyre/tube removal and refitting/replacement is known
3. Inspect tubes and tyres to assess repairability	3.1 Tyres and tubes are inspected without causing damage to any component or system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 Appropriate workplace documentation is completed and dealt with relevant to inspection outcomes
	3.4 Inspections and tests are carried out according to manufacturer/component supplier specifications for methods, tools and equipment used relevant to the application
	3.5 All inspection activities are carried out according to industry regulations/guidelines, OH&S legislation, legislation and enterprise procedures/policies
	3.6 Tyres are correctly assessed as major, minor or unrepairable in relation to tyre repair
	3.7 Company liability in relation to tyre inspection is known
4. Carry out minor tube and tyre repair	4.1 Tyre and tube repairs are completed without causing damage to any component or system
	4.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	4.3 Repair or replacement of tubes and tyres is to be carried out according to manufacturer/component supplier specifications for methods, tools and equipment used and tolerances relevant to the application
	4.4 Appropriate workplace documentation is completed and dealt with relevant to repair outcomes
	4.5 All repair activities are carried out according to industry regulations/guidelines. OH&S legislation, legislation and enterprise procedures/policies

ELEMENT	PERFORMANCE CRITERIA
5. Clean up work area and maintain equipment	5.1 Material that can be reused is collected and stored
	5.2 Waste and scrap is removed following workplace procedures
	5.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	5.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	5.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	5.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Tyres and tubes (plant)	• Machines are to include safety cages, air compressors and tyre changers
	• Material to include rims, tyres, tubes and valves
Unit scope	• Work involves removal, inspect, carry out repairs or replacement tyres and tubes and refit
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, environmental issues, tyre fitting and repair procedures and vehicle operational requirements
	• Competency may be demonstrated in workplaces involved in on-site, roadside repair, council general workshop, dealerships and tyre centres

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include hand and power tools, tyre gauges and air compressors and may include, but not be limited to:
  - wheel assembly lifting equipment
  - specialised equipment such as buffs, spreaders, tyre removal equipment, immersion tanks

Material

- Material is to include tyres, tubes, gatters, valves, adhesives, tyre repair patches/kits and tube repair patches

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of first aid, fire extinguisher and cleaning equipment and safety apparel
- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, tyre charts, material safety data sheets, Australian Design Rules and customer requirements
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information, repair procedures for tubes and tyres and safe working practices to prepare for work
- Identify material used in the work process

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow work instructions, operating procedures and inspection processes to:
  - Minimise the risk of injury to self and others
  - Prevent damage and wastage of goods, equipment and products
  - Maintain required production output and product quality
- Identify, set up, operate and maintain tyre changing equipment, air compressor and lines
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Types of tubes and tyres and their construction
- Inspection procedures to determine repairability (major, minor or unrepairable)
- Company liability in relation to tyre repair
- Roadworthy regulations relating to tyres and rims
- Tyre and tube removal and refitting/replacement procedures (including rim types)
- Tyre and tube repair procedures
- Tyre fill identification, types and application
- Tyre fill adding/removal methods and procedures
- Safety precautions related to handling of tyre fill substances
- Equipment maintenance procedures
- Relevant technical information
- Equipment safety requirements
- Planning of tyre and tube repair or replacement processes and techniques
- OH&S policies and procedures
- Workplace guidelines regarding acceptable tolerance levels
- Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to the repair and replacement of tyres and tubes, work orders, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, co-ordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 3)
Use technology	Use the workplace technology related to repairing and replacing tyres and tubes including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to vehicle and manufacturer tyre specifications as identified in the Range Statement, standard operating procedures and job sheets

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2801A Remove, repair and refit tyres and tubes (mining)

Unit descriptor

This unit covers the competency to remove and refit tyres and tubes from wheel rims, add and remove ballast, inspect tyres and tubes to assess repairability and perform minor tyre and tube repairs.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including safety cages, personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Remove and refit/ replace tyres and tubes	2.1 Removal and refitting/replacement of tyres and tubes is achieved without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 Identify, locate and purge toxic fill substances according to OH&S requirements and manufacturer/component supplier specifications
	2.4 Removal and refitting/replacement is to be carried out according to manufacturer/component supplier specifications for methods, fasteners, tools and equipment used and tolerances relevant to the component/assembly
	2.5 Appropriate workplace documentation is completed and dealt with relevant to removal and refitting/replacement outcomes
	2.6 All removal and refitting/replacement activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies

ELEMENT	PERFORMANCE CRITERIA
2. Remove and refit/ replace tyres and tubes (continued)	2.7 Company liability in relation to tyre/tube removal and refitting/replacement is known
3. Add and remove ballast	3.1 Ballast is added and removed without causing damage to any component or system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 Appropriate workplace documentation is completed and dealt with relevant to add and remove ballast outcomes
	3.4 Addition and removal of ballast is to be carried out according to manufacturer/component supplier specifications for methods, material, tools and equipment used and tolerances relevant to the application
	3.5 All activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
	3.6 Company liability in relation to adding and removing ballast is known
4. Inspect tubes and tyres to assess repairability	4.1 Tyres and tubes are inspected without causing damage to any component or system
	4.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	4.3 Appropriate workplace documentation is completed and dealt with relevant to inspection outcomes
	4.4 Inspections and tests are carried out according to manufacturer/component supplier specifications for methods, tools and equipment used relevant to the application
	4.5 All inspection activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
	4.6 Tyres are correctly assessed as major, minor or unrepairable in relation to tyre repair
	4.7 Company liability in relation to tyre inspection is known

ELEMENT	PERFORMANCE CRITERIA
5. Carry out minor tube and tyre repair	5.1 Tyre and tube repairs are completed without causing damage to any component or system
	5.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	5.3 Repair or replacement of tubes and tyres is to be carried out according to manufacturer/component supplier specifications for methods, tools and equipment used and tolerances relevant to the application
	5.4 Appropriate workplace documentation is completed and dealt with relevant to repair outcomes
	5.5 All repair activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies
6. Clean up work area and maintain equipment	6.1 Material that can be reused is collected and stored
	6.2 Waste and scrap is removed following workplace procedures
	6.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	6.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	6.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	6.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Mining vehicle tyres and tubes	• Machines are to include safety cages, air compressors and tyre changers
	• Material to include rims, tyres, tubes and valves

RANGE STATEMENT

Unit scope

- Work involves removal, inspect, carry out repairs or replacement tyres and tubes and refit

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, environmental issues, tyre fitting and repair procedures and vehicle operational requirements
- Competency may be demonstrated in workplaces involved in mining locations, dealerships and tyre centres

Tools and equipment

- Tools and equipment are to include hand and power tools, tyre gauges and air compressors and may include, but not be limited to:
  - Wheel assembly lifting equipment
  - Specialised equipment such as buffs, spreaders, tyre removal equipment, immersion tanks

Material

- Material are to include tyres, tubes, gatters, patches, valves, adhesives, ballast, fillers, tyre repair patches/kits and tube repair patches

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of first aid, fire extinguisher and cleaning equipment and safety apparel
- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, tyre charts, material safety data sheets, Australian Design Rules and customer requirements
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information, repair procedures for tubes and tyres and safe working practices to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain tyre changing equipment, ballast installation, air compressor and lines
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Types of tubes and tyres and their construction
- Inspection procedures to determine repairability (major, minor or unrepairable)
- Company liability in relation to tyre repair
- Roadworthy regulations relating to tyres and rims
- Tyre and tube removal and refitting/replacement procedures (including rim types)
- Tyre and tube repair procedures
- Ballast identification, types and application

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Ballast requirement calculation procedures
- Ballast adding and removal procedures
- Tyre fill identification, types and application
- Tyre fill adding/removal methods and procedures
- Safety precautions related to handling of tyre fill substances
- Relevant technical information
- Equipment safety requirements
- Equipment maintenance procedures
- Planning of tyre and tube repair or replacement processes and techniques
- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels
- Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related the repair and replacement of mining vehicle tyres and tubes, work orders, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 3)
Use technology	Use the workplace technology related to repairing and replacing tyres and tubes including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to vehicle and manufacturer/component supplier as identified in the Range Statement, standard operating procedures and job sheets
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2802A Remove, repair and refit tyres and tubes (light truck)

Unit descriptor

This unit covers the competency to remove and refit/replace light truck vehicle tyres and tubes from wheel rims, inspect tyres and tubes to assess repairability and perform minor tyre and tube repairs on light trucks

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including safety cages, personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Remove and refit/ replace tyres and tubes	2.1 Removal and refitting/replacement of tyres and tubes is achieved without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 Identify, locate and purge toxic fill substances according to OH&S requirements and manufacturer/component supplier specifications
	2.4 Removal and refitting/replacement is to be carried out according to manufacturer/component supplier specifications for methods, fasteners, tools and equipment used and tolerances relevant to the component/assembly
	2.5 Appropriate workplace documentation is completed and dealt with relevant to removal and refitting/replacement outcomes

ELEMENT	PERFORMANCE CRITERIA
2. Remove and refit/ replace tyres and tubes (continued)	2.6 All removal and refitting/replacement activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
	2.7 Company liability in relation to tyre/tube removal and refitting/replacement is known
3. Inspect tubes and tyres to assess repairability	3.1 Tyres and tubes are inspected without causing damage to any component or system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 Appropriate workplace documentation is completed and dealt with relevant to inspection outcomes.
	3.4 Inspections and tests are carried out according to manufacturer/component supplier specifications for methods, tools and equipment used relevant to the application
	3.5 All inspection activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
	3.6 Tyres are correctly assessed as major, minor or unrepairable in relation to tyre repair
	3.7 Company liability in relation to tyre inspection is known
4. Carry out minor tube and tyre repair	4.1 Tyre and tube repairs are completed without causing damage to any component or system
	4.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	4.3 Repair or replacement of tubes and tyres is to be carried out according to manufacturer/component supplier specifications for methods, tools and equipment used and tolerances relevant to the application
	4.4 Appropriate workplace documentation is completed and dealt with relevant to repair outcomes
	4.5 All repair activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies

ELEMENT	PERFORMANCE CRITERIA
5. Clean up work area and maintain equipment	5.1 Material that can be reused is collected and stored
	5.2 Waste and scrap is removed following workplace procedures
	5.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	5.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	5.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	5.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Light road truck	• Machines are to include safety cages, air compressors and tyre changers
	• Material are to include rims, tyres, tubes and valves
Unit scope	• Work involves removal and inspection, carry out repairs or replacement tyres and tubes and refit
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code, and safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, environmental issues, tyre fitting and repair procedures and vehicle operational requirements
	• Competency may be demonstrated in workplaces involved in tyre centres, road side repair, dealerships and repair shops

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include hand and power tools, tyre gauges and air compressors and may include, but not be limited to:
  - wheel assembly lifting equipment
  - specialised equipment such as buffs, spreaders, tyre removal equipment and immersion tanks

Material

- Material are to include tyres, tubes, gatters, patches, valves, adhesives, tyre repair patches/kits and tube repair patches.

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, tyre charts, material safety data sheets, Australian Design Rules and customer requirements
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information, repair procedures for tubes and tyres and safe working practices to prepare for work
- Identify material used in the work process

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain tyre changing equipment, air compressor and lines
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

The types, characteristics, uses and limitations of:

- Types of tubes and tyres and their construction
- Inspection procedures to determine repairability (major, minor or unrepairable)
- Company liability in relation to tyre repair
- Roadworthy regulations relating to tyres and rims
- Tyre and tube removal and refitting/replacement procedures (including rim types)
- Tyre and tube repair procedures
- Relevant technical information
- Equipment safety requirements
- Equipment maintenance procedures
- Planning of tyre and tube repairs or replacement processes and techniques
- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels
- Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to repair and replacement of tyres and tubes, work orders, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 3)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 3)
Use technology	Use the workplace technology related to repairing and replacing tyres and tubes including tools, equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to vehicle and tyre manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures and job sheets

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2803A Remove, repair and refit tyres and tubes (heavy truck - road)

Unit descriptor

This unit covers the competency to remove and refit/replace heavy vehicle tyres and tubes from wheel rims, inspect tyres and tubes to assess repairability and perform minor tyre and tube repairs.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including safety cages, personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Remove and refit/ replace tyres and tubes	2.1 Removal and refitting/replacement of tyres and tubes is achieved without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 Removal and refitting/replacement is to be carried out according to manufacturer/component supplier specifications for methods, fasteners, tools and equipment used and tolerances relevant to the component/assembly
	2.4 Appropriate workplace documentation is completed and dealt with relevant to removal and refitting/replacement outcomes
	2.5 All removal and refitting/replacement activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
	2.6 Company liability in relation to tyre/tube removal and refitting/replacement is known

ELEMENT	PERFORMANCE CRITERIA
3. Inspect tubes and tyres to assess repairability	3.1 Tyres and tubes are inspected without causing damage to any component or system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 Appropriate workplace documentation is completed and dealt with relevant to inspection outcomes.
	3.4 Inspections and tests are carried out according to manufacturer/component supplier specifications for methods, tools and equipment used relevant to the application
	3.5 All inspection activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
	3.6 Tyres are correctly assessed as major, minor or unrepairable in relation to tyre repair
	3.7 Company liability in relation to tyre inspection is known
4. Carry out minor tube and tyre repair	4.1 Tyre and tube repairs are completed without causing damage to any component or system
	4.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	4.3 Repair or replacement of tubes and tyres is to be carried out according to manufacturer/component supplier specifications for methods, tools and equipment used and tolerances relevant to the application
	4.4 Appropriate workplace documentation is completed and dealt with relevant to repair outcomes
	4.5 All repair activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies
5. Clean up work area and maintain equipment	5.1 Material that can be reused is collected and stored
	5.2 Waste and scrap is removed following workplace procedures
	5.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	5.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Clean up work area and maintain equipment (continued)	5.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	5.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Heavy road vehicle tyres and tubes	• Machines are to include safety cages, air compressors and tyre changers
	• Material are to include rims, tyres, tubes and valves
Unit scope	• Work involves removal and inspection, carry out repairs or replace tyres and tubes and refit
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code, and safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, environmental issues, tyre fitting and repair procedures and vehicle operational requirements
	• Competency may be demonstrated in workplaces involved in tyre centres, roadside repair, dealerships and repair shops
Tools and equipment	• Tools and equipment are to include hand and power tools, Tyre gauges and air compressors and may include, but not be limited to:
	• Wheel assembly lifting equipment
	• Specialised equipment such as buffs, spreaders, tyre removal equipment, immersion tanks
Material	• Material are to include tyres, tubes, gatters, patches, valves, adhesives, tyre repair patches/kits and tube repair patches

RANGE STATEMENT

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, tyre charts, material safety data sheets, Australian Design Rules and customer requirements
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information, repair procedures for tubes and tyres and safe working practices to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Identify, set up, operate and maintain tyre changing equipment, air compressor and lines
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Types of tubes and tyres and their construction
  - Inspection procedures to determine repairability (major, minor or unrepairable)
  - Company liability in relation to tyre repair
  - Roadworthy regulations relating to tyres and rims
  - Tyre and tube removal and refitting/replacement procedures (including rim types)
  - Tyre and tube repair procedures
  - Relevant technical information
  - Equipment safety requirements
  - Equipment maintenance procedures
  - Planning of tyre and tube repairs or replacement processes and techniques
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels
  - Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to the repair and replacement of tyres and tubes, work orders, plans and safety procedures.

(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 3)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 2)
Use technology	Use the workplace technology related to repairing and replacing tyres and tubes including tools, equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to vehicle and tyre manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures and job sheets
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2804A Remove, repair and refit tyres and tubes (agricultural machinery)

Unit descriptor

This unit covers the competency to remove and refit agricultural machinery tyres and tubes from wheel rims, add and remove ballast, inspect tyres and tubes to assess repairability and perform minor tyre and tube repairs.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including safety cages, personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Remove and refit/ replace tyres and tubes	2.1 Removal and refitting/replacement of tyres and tubes is achieved without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 Identify, locate and purge toxic fill substances according to OH&S requirements and manufacturer/component supplier specifications
	2.4 Removal and refitting/replacement is to be carried out according to manufacturer/component supplier specifications for methods, fasteners, tools and equipment used and tolerances relevant to the component/assembly
	2.5 Appropriate workplace documentation is completed and dealt with relevant to removal and refitting/replacement outcomes
	2.6 All removal and refitting/replacement activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies

ELEMENT	PERFORMANCE CRITERIA
2. Remove and refit/ replace tyres and tubes (continued)	2.7 Company liability in relation to tyre/tube removal and refitting/replacement is known
3. Add and remove ballast	3.1 Ballast is added and removed without causing damage to any component or system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 Appropriate workplace documentation is completed and dealt with relevant to add and remove ballast outcomes
	3.4 Addition and removal of ballast is to be carried out according to manufacturer/component supplier specifications for methods, material, tools and equipment used and tolerances relevant to the application
	3.5 All activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
	3.6 Company liability in relation to adding and removing ballast is known
4. Inspect tubes and tyres to assess repairability	4.1 Tyres and tubes are inspected without causing damage to any component or system
	4.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	4.3 Appropriate workplace documentation is completed and dealt with relevant to inspection outcomes
	4.4 Inspections and tests are carried out according to manufacturer/component supplier specifications for methods, tools and equipment used relevant to the application
	4.5 All inspection activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
	4.6 Tyres are correctly assessed as major, minor or unrepairable in relation to tyre repair
	4.7 Company liability in relation to tyre inspection is known

ELEMENT	PERFORMANCE CRITERIA
5. Carry out minor tube and tyre repair	5.1 Tyre and tube repairs are completed without causing damage to any component or system
	5.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	5.3 Repair or replacement of tubes and tyres is to be carried out according to manufacturer/component supplier specifications for methods, tools and equipment used and tolerances relevant to the application
	5.4 Appropriate workplace documentation is completed and dealt with relevant to repair outcomes
	5.5 All repair activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies
6. Clean up work area and maintain equipment	6.1 Material that can be reused is collected and stored
	6.2 Waste and scrap is removed following workplace procedures
	6.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	6.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	6.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	6.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Agricultural tyres and tubes	• Machines are to include safety cages, air compressors and tyre changers
	• Material are to include rims, tyres, tubes and valves
Unit scope	• Work involves removal and inspect, carry out repairs or replace tyres and tubes and refit

RANGE STATEMENT

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, environmental issues, tyre fitting and repair procedures and vehicle operational requirements
- Competency may be demonstrated in workplaces involved in farming, bulk handling, dealerships, tyre centres

Tools and equipment

- Tools and equipment are to include hand and power tools, Tyre gauges and air compressors and may include, but not be limited to:
  - Wheel assemble lifting equipment
  - Specialised equipment such as buffs, spreaders, tyre removal equipment, immersion tanks, safety cages, vulcanising equipment

Material

- Material are to include tyres, tubes, gatters, patches, valves, adhesives, ballast, tyre repair patches/kits and tube repair patches

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, tyre charts, material safety data sheets, Australian Design Rules and customer requirements
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information, repair procedures for tubes and tyres and safe working practices to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain tyre changing equipment, ballast installation, air compressor and lines
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

The types, characteristics, uses and limitations of:

- Types of tubes and tyres and their construction
- Inspection procedures to determine repairability (major, minor or unrepairable)
- Company liability in relation to tyre repair
- Roadworthy regulations relating to tyres and rims
- Tyre and tube removal and refitting/replacement procedures (including rim types)
- Tyre and tube repair procedures
- Ballast identification, types and application
- Ballast requirement calculation procedures

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Ballast adding and removal procedures
- Tyre fill identification, types and application
- Tyre fill adding/removal methods and procedures
- Safety precautions related to handling of tyre fill substances
- Relevant technical information
- Equipment safety requirements
- Equipment maintenance procedures
- Relevant manufacturer/component supplier/company policies
- Legislation where applicable
- Manual handling procedures
- Personal safety requirements
- Planning of tyre and tube repairs or replacement processes and techniques
- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels
- Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to the repair and replacement of tyres and tubes, work orders, plans and safety procedures.

(Level 2)

EVIDENCE GUIDE

Underpinning Skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 3)
Use technology	Use the workplace technology related to repairing and replacing tyres and tubes, including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to vehicle and tyre manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures and job sheets
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2812A Carry out brazing procedures

Unit descriptor

This unit covers the competency to carry out brazing procedures appropriate to the repairs conducted in the retail, service and repair streams.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Prepare components, tools and equipment for brazing procedures	2.1 Brazing procedures are completed without causing damage to any component or system
	2.2 Information is accessed from appropriate sources to enable brazing to be performed in accordance with vehicle and equipment manufacturer/component supplier procedures
	2.3 Brazing is carried out according to a standard that meets industry regulations/guideline, OH&S requirements, legislation and enterprise policy/procedures
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Brazing	• Equipment includes heating appliances • Material filler rods, fluxes
Unit scope	• Work involves preparation of material and application of brazing techniques
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in brazing, lifting, safety equipment, environmental issues, repair procedures and vehicle operational requirements • Competency may be demonstrated in workplaces involved in welding and fabrication, roadside service, dealership, panel repairs, accessory fitting, workshops and auto electrical

Tools and equipment	• Tools and equipment are to include but not be limited to:
	  • hand tools
	  • oxy acetylene/propane torch
	  • brazing equipment must include the appropriate rods and flux
	• Other resources may include: measuring equipment, marking out equipment

Material	• Material are to include cleaning components, solvents and fluxes, filler rods, brazing and silver solder rods
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including:
  - job sheets
  - vehicle manufacturer/component supplier specifications
  - enterprise operating procedures
  - component manufacture specifications
  - customer requirements
  - industry/workplace codes of practice
  - legislation for vehicle road worthiness including Australian Design Rules
  - material safety data sheets
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information from job sheets to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Identify, set up, operate and maintain heating equipment (oxy, propane), rods, flux and measuring equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

The types, characteristics, uses and limitations of:

- OH&S requirements
- Types of flux, rods and their application
- Personal safety requirements (e.g. toxic fumes/lead poisoning)
- Equipment safety requirements
- Equipment maintenance procedures
- Planning of brazing material, processes and techniques
- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels to be considered as per job sheet and manufacturer/ component supplier specification
- Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to brazing work orders, plans and safety procedures. (Level 1)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements required for the work. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 2)
Use technology	Use the workplace technology related to • Access, interpret and apply technical information • Use relevant tools and equipment • Application of personal safety requirements • Application of brazing procedures. Including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	Access to vehicle and manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2817A Carry out minor fabrication of components/ equipment

Unit descriptor

This unit covers the competency to measure, mark out and carry out fabrication of components/equipment under supervision and minimum skills.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Basic fabrication of components and equipment	2.1 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.2 Fabrication is completed without causing damage to any component or system
	2.3 Suitable material are selected and components/ equipment fabricated to specific requirements
	2.4 Procedures for set up are followed in accordance with the plan, customer requirements and specifications
	2.5 Tools, equipment and material are located on site and confirmed for commencement of production in accordance with enterprise established procedures
3. Follow fabrication process	3.1 Follow work plan to commence fabrication
	3.2 Check fabrication for conformity to specification

ELEMENT	PERFORMANCE CRITERIA
4. Monitor fabrication process and outputs	4.1 Monitor key characteristics to ensure conformity is to specification during fabrication process
	4.2 Product tagged and stored correctly and safely for future use
	4.3 All fabrication operations are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
5. Clean up work area and maintain equipment	5.1 Material that can be reused is collected and stored
	5.2 Waste and scrap is removed following workplace procedures
	5.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	5.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	5.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	5.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Fabricate components and equipment	• Machines are to include welding, bending, cutting, measuring and painting
Unit scope	• Work involves welding, heating, soldering, measuring, mechanical fastening, cutting, shaping, bending, bonding, gluing, marking and assembling

RANGE STATEMENT

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, environmental issues, repair procedures and vehicle operational requirements
- Competency may be demonstrated in workplaces involved in welding and fabrication, dealerships, panel repairs, accessory fitting, workshops

Tools and equipment

- Tools and equipment are to include, but not be limited to:
  - Hand tools, power tools, relevant welding equipment, cutting equipment, measuring equipment, marking out equipment, lifting and bending equipment

Material

- Material are to include sheet metal, bonding material, steel, paints and plastics

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including
  - job sheets
  - vehicle manufacturer/component supplier specifications
  - enterprise operating procedures
  - component manufacture specifications
  - customer requirements
  - industry/workplace codes of practice
  - legislation for vehicle road worthiness including Australian Design Rules
  - material safety data sheets
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret customer requirements and job sheets to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain appropriate equipment to complete the task assigned
- Conduct operator maintenance on welding, bending, lifting and measuring equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

The types, characteristics, uses and limitations of:

- OH&S requirements
- Industry codes of practice
- Equipment safety requirements
- Legislation where applicable
- Types of material and their application
- Fabrication procedures
- Marking out and cutting procedures
- Methods of fastening/gluing/bonding

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Relevant technical information
- Equipment maintenance procedures
- Vehicle safety requirements
- Relevant manufacturer/component supplier /company policies
- Material safety requirements
- Personal safety requirements
- Planning of fabrication, processes and techniques
- Characteristics of material and uses of products produced
- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels
- Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of line and material. (Level 2)
Use technology	Use the workplace technology related to: • Access, interpret and apply technical information • Use relevant tools and equipment • Use relevant methods of marking out and cutting • Use relevant methods of assembling project • Fabricate components and equipment • Monitor production process • Evaluate finished product against consumer/customer requirements including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to vehicle and manufacturer/component supplier specifications as identified in the Range Statement and standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2818A Comply with laws, regulations and codes of practice relating to the industry

Unit descriptor

This unit covers the competency to use and comply with relevant laws, regulations and codes of practice that apply to the industry.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Comply with the legal obligations of the Automotive Industry	2.1 Correct information is accessed and interpreted
	2.2 Assess information from appropriate sources to determine relevant area of legislation
	2.3 Relevant legislation is complied with ensuring that all legal requirements are met
3. Comply with established industrial relations practices and requirements	3.1 Correct information is accessed and interpreted covering current industrial relations agreements/awards
	3.2 Assess information from appropriate sources to determine relevant area of agreement/award
	3.3 Relevant agreements/awards are complied with ensuring that all requirements are met

ELEMENT	PERFORMANCE CRITERIA
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Waste and scrap is removed following workplace procedures
	4.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	4.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	4.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Compliance with laws, regulations and Codes of Practice	• Articles of law and codes of practice
Unit scope	• Work involves identifying, understanding and implementing articles and actions relating to laws, regulations and codes of practice
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in the interpretation of laws, regulations and codes of practice
	• Competency may be demonstrated in workplaces involved in marine sales, service station operation, dealerships, roadside repairs, general repair, tyre centres but not limited to any industry enterprise

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include but not be limited to operation of any hand, power or specialised tools covered by the appropriate law, regulation or code of practice

Material

- Material are to include articles of law, regulations, codes of practice and legislation affecting the context of the vocation

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including:
  - relevant industry awards
  - industrial award system
  - trade union system
  - relevant Registered Training Organisations and enterprises
  - employer/employee relationship
  - relevant legislation including OH&S requirements, building, health and hygiene, workers compensation, equal opportunity, anti-discrimination articles
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and enterprise operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret laws, regulations and codes of practice to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain industry awards, legislation and industry codes of practice
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

The types, characteristics, uses and limitations of:

- Retail, service and repair award/State award to cover relevant area
- Legislation
- Enterprise operating procedures
- Industry/Workplace Codes of Practice
- Workplace guidelines regarding acceptable tolerance levels.
- Workplace safety policies and procedures
- Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to laws, regulations and codes of practice work orders, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)
Solve problems	Use pre-checking and inspection techniques to anticipate interpretation problems, avoid wastage reworking and avoid wastage. (Level 1)
Use technology	Use the workplace technology related to the implementation of laws, regulations and codes of practice including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to industry law, regulation and codes of practice as identified in the Range Statement, standard operating procedures

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2821A Service and rectify faults in electronic suspension systems

Unit descriptor This unit covers the competency to locate and rectify faults in electronic suspension systems.

Prerequisite AUR18708A Carry out minor repairs to electrical circuits/systems

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment quantities and service manuals
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including personal protection needs, are observed throughout the work
2. Service and adjust electronic suspension systems	2.1 Access and interpret relevant service information prior to commencing servicing procedures
	2.2 Determine the current status and previous fault history of the relevant electronic suspension system in conjunction with the customer
	2.3 Confirm the current status of the electronic suspension system through an appropriate road test program
	2.4 Service the electronic suspension system in accordance with manufacturer/component supplier specifications and enterprise procedures
	2.5 Ensure relevant fluids and lubricants are used in accordance with OH&S and manufacturer/component supplier specifications
	2.6 Dispose of used fluids and lubricants according to enterprise and OH&S procedures
3. Rectify identified electronic suspension system faults	3.1 Interpret road test results to verify systems fault diagnosis
	3.2 Notify the customer of identified fault(s) and ensure agreement is given before work is carried out
	3.3 Remove faulty components and refit with approved replacement parts in accordance with relevant workplace procedures and customer requirements

ELEMENT	PERFORMANCE CRITERIA
3. Rectify identified electronic suspension system faults (continued)	3.4 Dispose faulty components in accordance with workplace procedures and warranty requirements if applicable
	3.5 Complete system adjustments relevant to components replaced
4. Test and confirm system faults have been rectified	4.1 Carry out test procedures to confirm rectification of system faults
	4.2 Complete appropriate documentation in accordance with workplace/customer requirements
	4.3 Explain, to the satisfaction of the customer, the outcomes of all rectification work to enable invoicing documentation to be completed.
5. Clean up work area and maintain equipment	5.1 Material that can be reused is collected and stored
	5.2 Waste and scrap is removed following workplace procedures
	5.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	5.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	5.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	5.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves testing, servicing and minor repairs to electronic suspension systems fitted to light passenger and 4wd vehicles

RANGE STATEMENT

Unit context	• OH&S requirements include Australian Standards, safety management systems, hazardous substances and dangerous goods code, safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills • Competency may be demonstrated in workplaces involved in auto electrical, dealerships, roadside service, general repairs, auto accessory fitting, collision repair and steering establishments
Tools and equipment	• Tools and equipment are to include hand tools including multimeters and testing equipment and may include, but not be limited to power tools, air tools, special tools for removal/adjustment specialist system tester
Material	• Material are to include electronic components, wire, solder
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets, manufacturer/component supplier data sheets and customer requests • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information from job sheets to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - Minimise the risk of injury to self and others
  - Prevent damage and wastage of goods, equipment and products
  - Maintain required production output and product quality
- Identify, set up, operate specialist testing equipment and multimeters
- Conduct operator maintenance as per manufacturer/ component supplier specifications
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - OH&S requirements
  - Service/repair, removal, replacement and adjustment procedures relevant to application
  - Operating principles of body management systems
  - Construction and operation of body management systems/components relevant to application
  - Planning processes and techniques
  - Characteristics of material and uses of products produced
  - Workplace guidelines regarding Australian Standards
  - Workplace safety policies and procedures
  - Procedures for reporting equipment faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to: • Testing electronic body management systems • Service/repair of electronic body management systems work orders, plans and safety procedures (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and cleaning problems, avoid re working and avoid wastage (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to:

- Accessing, interpreting and applying technical information
- Safely and correctly use tools and equipment
- Service/repair, adjust and/or replace systems/components as necessary
- Application of testing, inspection and evaluation of body management system/components

including tools and equipment

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to manufacturer/component supplier specifications, enterprise operating procedures, customer requirements, codes of practice, legislation (including Australian Design Rules) as identified in the Range Statement, standard operating procedures

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT2833A Service gas fuel systems (CNG/NGV)

Unit descriptor

This unit covers the competency to service CNG/NGV fuel systems including system/component inspection appropriate to vehicle periodical service requirements.

Systems Definition: Compressed Natural Gas (CNG)

Natural Gas Vehicle (NGV)

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment quantities and service manuals
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including personal protection needs, are observed throughout the work
2. Service Compressed Natural Gas (CNG)/ Natural Gas Vehicle (NGV) fuel systems	2.1 Natural Gas (CNG)/Natural Gas Vehicle (NGV) fuel system service is completed without causing damage to any component system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specification
	2.3 CNG/NGV fuel system service is carried out in accordance with vehicle/system manufacturer/component supplier current specifications for methods, equipment used and tolerances relative to the vehicle/system
	2.4 Appropriate workplace documentation is completed and dealt with relevant to installation outcomes
	2.5 Service activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment (continued)	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

CNG/NGV fuel supplied vehicles	• The servicing of Natural Gas (CNG)/ Natural Gas Vehicle (NGV) fuel systems to light, heavy vehicles, vessels, out door power equipment and forklift trucks
Unit scope	• Work involves visual inspection and assembling. Methods should be applied under normal operating conditions
Unit context	• OH&S requirements include Australian Standards, safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in servicing of CNG/NGV systems
	• Competency may be demonstrated in workplaces involved in the servicing of CNG/NGV fuel supply vehicles
Tools and equipment	• Tools and equipment are to include hand tools, exhaust gas analyser, pressure/vacuum gauge, multimeter, leak detector
Material	• Material are to include replacement components, CNG/NGV and cleaning material
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices, footwear, clothing and gloves

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, material safety data sheets and service manuals
- Workplace procedures relating to reporting and communication including maintaining customer records
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret installation instructions, job sheets, material safety data sheets and service manuals
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain CNG/NGV fitting cleaning and testing equipment
- Conduct operator maintenance on service equipment and hand tools
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Principles of operation of gas fuel systems
  - Servicing procedures
  - Equipment/material safety requirements
  - Personal safety procedures
  - Legislation where applicable
  - Industry codes of practice
  - Australian Standards – AS1425, AS2739, AS2746
  - Planning correct processes and techniques for servicing CNG/NGV fuelled vehicles/components
  - Workplace guidelines regarding Australian Standards
  - Workplace safety policies and procedures
  - Procedures for reporting equipment faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to CNG/NGV service and replacement procedures, work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 1)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 1)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)
Solve problems	Use pre-checking and inspection techniques to anticipate planing and cleaning problems, avoid re working and avoid wastage. (Level 1)
Use technology	Use the workplace technology related to CNG/NGV vehicle servicing including tools and equipment. (Level 1)

EVIDENCE GUIDE

Resource implications	• Access to CNG/NGV fuel supplied vehicles and/or components as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and may include electronic, verbal, written or questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3501A Implement and monitor environmental regulations and best practice in the marine repair industry

Unit descriptor

This unit covers the competency to undertake the repair, maintenance and installation of marine craft engines and or components and electrical systems in a manner that ensures the protection of the environment.

ELEMENT	PERFORMANCE CRITERIA
1. Implement relevant environment regulations	1.1 Reasons for ethical environmental practice in a marine maintenance, repair and installation workplace are identified
	1.2 Environmental responsibilities of employees in a marine maintenance, repair and installation workplace are identified
	1.3 Penalties for individual breaches of the legislation are identified
	1.4 Waste is minimised, wastes including biological material (marine biota), sludge and solids are sorted and stored in appropriate bins for recycling or disposal
2. Monitor and avoid hazards to stormwater, foreshores and marine environments	2.1 No wastewater or contaminants are allowed to enter stormwater systems, foreshores or marine environments
	2.2 All vessel, engine and component repairs, maintenance and installation are undertaken in an environmentally responsible manner to avoid hazards to stormwater systems, foreshores and marine environments
	2.3 Engine and component cleaning is carried out in an area that is bunded or graded to a collection pit
	2.4 All preparation areas, in particular anti-foulant paint preparation, are bunded and undercover to ensure accidental spillage cannot escape into stormwater systems, foreshores and marine environments
	2.5 All components containing environmentally hazardous material are stored undercover in a sealed and bunded area
	2.6 All liquid wastes are drained into appropriate storage or recycling containers
	2.7 Bilge water is disposed of in an appropriate manner

ELEMENT	PERFORMANCE CRITERIA
2. Monitor and avoid hazards to stormwater, foreshores and marine environments (continued)	2.8 Spill kit is located and used as needed and disposed of as controlled waste by a licensed contractor to prevent stormwater, foreshore pollution and damage to the marine environment
	2.9 Spills are cleaned up immediately and the workplace is kept clean to prevent unintentional pollution to stormwater, foreshores and the marine environment
3. Monitor and avoid hazards to air quality	3.1 Welding, soldering and thermal cutting is conducted in a well ventilated area
	3.2 Hazards of airborne particles are monitored, minimised and contained
	3.3 Hazards of gases are identified, monitored and contained
	3.4 Clean up of guns and general tools and equipment is conducted in an environmentally safe manner
4. Monitor and avoid noise hazards	4.1 Noise generating activities are minimised and carried out within approved operating hours

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Marine maintenance, repair and installation workplace	▪ Marine workplace undertaking either generalist or specialist repairs to marine vessels or components
Unit scope	▪ Work involves the normal activities of a marine maintenance and repair workplace including the installation, removal, repair, testing and replacement of marine craft engines, the installation, removal, repair, testing and replacement of marine electrical systems and components, welding, soldering and thermal cutting of marine components and the removal and preparation of vessel surfaces and components for painting with anti-foulant based products
	▪ This unit is primarily aimed at those undertaking qualifications; AUR32199 Marine Installer or AUR32299 Marine Mechanic

RANGE STATEMENT

Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in undertaking environmentally sound work practices • Competency may be demonstrated in workplaces involved in the repair, maintenance and installation of marine craft engines, component and electrical systems and components
Tools and equipment	• Tools and equipment are to include spill kits, recycling bins and drums, parts washers, bunded wash bays, air extraction equipment, slipways and hardstand areas with pollution control measures and diversion valves and waste water management system
Material	• Material safety data sheets
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Environmental legislation, regulations and advice • Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets/cards • Workplace procedures relating to reporting and communication of environmental issues • Manufacturer/component supplier specifications and operational procedures • Site environmental policy

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Implement environmental regulations and best practice
- Identify material used in the repair, maintenance and installation process and assess their environmental impact
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Conduct operator maintenance on tools and equipment to ensure environmental efficiency
- Work effectively with others
- Modify activities to cater for variations in workplace context and the environment
- Use of a spill kit

Underpinning knowledge

- Relevant aspects of environmental legislation and its implications to work being undertaken
- Characteristics and potential environmental impact of products used in the repair, maintenance and installation of marine craft engines, components and electrical systems
- Philosophy of reduces, reuse, and recycle
- Procedures for reporting machinery faults and material defects
- Action to be taken in case of significant environmental threat in the workplace
- Reporting procedures for significant environmental damage occurring in the workplace
- Awareness of the environmental effects of Tributylin, arsenic, mercury, copper, lead, hydrocarbons, oil/oily water and DDT on marine environments

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to environmental procedures from legislation, regulations, policies, guidelines, standards and workplace practices in a marine maintenance, repair and installation workshop. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable all work undertaken is in accordance with environmental best practice, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation of equipment and material and the selection of an appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Use planning, checking, inspection and investigative techniques to avoid any environmental contamination and wastage. (Level 2)
Use technology	Use the workplace technology related to environmental protection measures. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a marine maintenance, repair and installation workplace with access to marine crafts requiring repair, maintenance, testing or installing of components and/or systems, parts washers, recycling bins and pressure washing equipment with waste water recycling ability
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3502A Implement and monitor environmental regulations and best practice in the automotive mechanical industry

Unit descriptor

This unit covers the competency to undertake the service or repair of light or heavy vehicles, motorcycles, outdoor power equipment or their components in a manner that ensures the protection of the environment.

ELEMENT	PERFORMANCE CRITERIA
1. Implement relevant environment regulations	1.1 Reasons for ethical environmental practice in an automotive mechanical workplace or business are identified
	1.2 Environmental responsibilities of employees in an automotive mechanical workplace or business are identified
	1.3 Penalties for individual breaches of the legislation are identified
	1.4 Waste is minimised, waste material including sludge, solids and other wastes are sorted and stored in appropriate bins for recycling or disposal
	1.5 Packaging on goods received is sorted and reused or disposed of to recycling
2. Monitor and avoid hazards to stormwater	2.1 No wastewater or contaminants are allowed to enter the stormwater system
	2.2 All surface cleaning, engine degreasing and preparation is undertaken in an impervious paved area and does not contaminate stormwater
	2.3 All parts and components containing environmentally hazardous material are stored undercover in a sealed and bunded or drained treatment area.
	2.4 All liquid wastes are drained into appropriate storage or recycling containers
	2.5 Parts washing is undertaken in an approved parts washer that does not cause contamination of stormwater or ground
	2.6 Spill kit is located and used as needed to prevent stormwater contamination
	2.7 Drip trays are used under vehicles when any chance of spillage or leakage is present

ELEMENT	PERFORMANCE CRITERIA
2. Monitor and avoid hazards to stormwater (continued)	2.8 Spills are cleaned up immediately and workplace is kept clean to prevent unintentional stormwater pollution
	2.9 Hands are cleaned over drains connected to an oil/water separator or drums for collecting liquid waste
3. Monitor and avoid hazards to air quality	3.1 Vehicle exhausts and emissions are minimised and not permitted to collect in the workplace or business
	3.2 Hazards of airborne particles are monitored, minimised and contained
	3.3 Hazards of gases are monitored, minimised and contained
	3.4 Welding is conducting in a well ventilated area
4. Monitor and avoid noise hazards	4.1 Noise generating activities are minimised and carried out within approved operating hours

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Automotive mechanical workplace or business

- Mechanical workplace or business undertaking either general or specialist mechanical repairs to; light or heavy vehicles or their mechanical components, or motorcycles or outdoor power equipment. Specialised mechanical repairs can include transmissions, steering and suspension, brakes, engine reconditioning, diesel fuelled plant, exhausts and radiators
- This Unit is applicable to mechanical repairs, which involve the removal of components containing oils or other fluids. Other mechanical stream qualifications should use AURC2501A

RANGE STATEMENT

Unit scope	• Work involves the normal activities of a mechanical or mechanical specialist workplace or business including service, removal, repair or fitting of mechanical components for light vehicles, heavy vehicles, motorcycles and outdoor power equipment • This unit is applicable to many mechanical stream qualifications at both the certificate II and III level
Unit context	• OH&S requirements include material safety data sheets, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant OH&S regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in undertaking environmentally sound work practices • Competency may be demonstrated in workplaces involved in the service, repair, overhaul, replacement or fitting of vehicle parts and components
Tools and equipment	• Tools and equipment are to include recycling bins and drums, bunded or drained wash bays and preparation areas, parts washers, spill kits, quick break degreasing compounds, cleaning equipment, oil drip trays, waste management systems and waste water systems
Material	• Material safety data sheets
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Environmental legislation, regulations and advice • Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets • Workplace procedures relating to reporting and communication of environmental issues • Manufacturer/component supplier specifications and operational procedures • Site environmental policy

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Implement environmental regulations and best practice
- Identify material used in an automotive workplace or business and assess their environmental impact
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment
- Use of a spill kit
- Conduct operator maintenance on tools and equipment to ensure environmental efficiency

Underpinning knowledge

- Relevant aspects of environmental legislation and its implications to work being undertaken
- Characteristics and potential environmental impact of products used in automotive mechanical workplace or business
- Philosophy of prevention, reduce, reuse, recycle
- Procedures for reporting machinery faults and material defects
- Action to be undertaken in case of significant environmental threat in the workplace or business
- Reporting procedures for significant environmental damage occurring in the workplace

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to environmental procedures from legislation, regulations and workplace or business practices in an automotive mechanical workplace or business. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable all work undertaken is in accordance with environmental best practice, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation of equipment and material and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use planning, checking and inspection techniques to avoid environmental contamination and wastage. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology	Use the workplace technology related to environmental protection equipment.

(Level 2)

EVIDENCE GUIDE

Resource implications	• Access to an automotive mechanical workplace or business with a range of vehicles or mechanical components, spill kits, recycling drums, vacuum cleaners/brooms/mop and bucket, quick break degreasing agents, undercover bunded or drained areas liquid, sludge and solid wastes
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3834A Repair gas fuel systems (LPG)

Unit descriptor

This unit covers the competency to repair LPG fuel systems, remove and replace/repair components and test and recommission system.

Systems Definition: Liquefied Petroleum Gas (LPG)

Prerequisites

AURT2832A Service gas fuel systems

State/Territory Legislation requirements for registration

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment, quantities and service manuals
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
2. Repair Liquid Petroleum Gas (LPG) fuel systems and remove and replace components	2.1 Liquid Petroleum Gas (LPG) fuel systems and repair, remove and replace components is completed without causing damage to any component system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specification
	2.3 LPG fuel system repair/component removal and replacement is carried out in accordance with vehicle/system manufacturer/component supplier specifications for methods, equipment used and tolerances relative to the vehicle/system
	2.4 Appropriate workplace documentation is completed and dealt with relevant to installation outcomes
	2.5 Repair/component removal and replacement activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment (continued)	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

LPG fuelled vehicles	• Repairing of Liquefied Petroleum Gas (LPG) fuel systems to light, heavy vehicles, vessels, out door power equipment and fork lift trucks
Unit scope	• Work involves removing, repairing and replacing LPG components
Unit context	• OH&S requirements include Australian Standards, safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in diagnoses of LPG fuel supply components
	• Competency may be demonstrated in workplaces involved in the repair of LPG fuel supply components
Tools and equipment	• Tools and equipment are to include gas leakage testing equipment, hand tools, leak detector, exhaust gas analyser, pressure/vacuum gauge, multimeter and may include, but not be limited to hand held meters, computer testers, engine analysers, system tester, emission tester, pressure tester
Material	• Material are to include replacement components, LPG testing and cleaning material

RANGE STATEMENT

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices, footwear, clothing and gloves

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, material safety data sheets and instruction manuals
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures including maintaining customer records

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret installation instructions, job sheets, material safety data sheets and service manuals
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - Minimise the risk of injury to self and others
  - Prevent damage and wastage of goods, equipment and products
  - Maintain required production output and product quality
- Identify, set up, operate and maintain LPG fitting cleaning and testing equipment
- Conduct operator maintenance on LPG installation equipment

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Installation procedures
  - Testing and commissioning procedures
  - Equipment/material safety requirements
  - Personal safety requirements
  - Legislation where applicable
  - Industry codes of practice
  - Australian Standards – AS1425, AS2739, AS2746
  - Manual handling procedures
  - Planning correct processes and techniques for installing, testing and commissioning LPG systems
  - Workplace guidelines regarding Australian Standards
  - Workplace safety policies and procedures
  - Procedures for reporting equipment faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to installing LPG systems, work orders, plans and safety procedures for fabricating a component or piece of equipment.

(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and cleaning problems, avoid re working and avoid wastage. (Level 2)
Use technology	Use the workplace technology related to installing LPG systems including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to vehicle for installation of LPG systems as identified in the Range Statement, standard operating procedures

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and may include electronic, verbal, written or questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3805A Service auxiliary brakes

Unit descriptor

This unit covers the competency to service auxiliary brake systems and components for light/heavy vehicles.

Prerequisites

AUR07170A Service transmissions (automatic)

AUR18708A Carry out minor repairs to electrical circuits/systems

AUR03670A Service diesel fuel injection systems

AUR01170A Service engines and associated engine components

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions, including job sheets, are used to determine job requirements, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including safety cages, personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Service auxiliary brake systems and components	2.1 Service is completed without causing damage to any workplace property or vehicle
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 Auxiliary brake components are tested to comply with operational requirements
	2.4 All service/repair/testing activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves servicing of auxiliary brakes including engine exhaust, hydraulic retarders, electric retarders

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in servicing auxiliary braking systems
- Competency may be demonstrated in workplaces involved in defence force establishments, roadside service, manufacturing enterprises

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include specialised testing equipment and may include but not limited to hand tools, cleaning equipment, dial indicators, pressure gauges, multimeters, tachometers, brake performance testers

Material

- Material are to include hydraulic fluids, brake material, mechanical linkages, hydraulic and air lines

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets and defence force data sheets
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret job sheets, government orders, listing requirements to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Identify, set up, operate and maintain engine testing, pressure testing, electrical and brake testing equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning Knowledge

- The types, characteristics, uses and limitations of:
  - Servicing procedures
  - Principles of operation of automatic transmissions relevant to auxiliary braking
  - Electrical circuit testing
  - Equipment/material safety requirements
  - manufacturer/component supplier specification charts
  - Testing procedures
  - Personal safety requirements
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels and procedural issues
  - Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to servicing of auxiliary brakes, work orders, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 2)
Use technology	Use the workplace technology related to servicing auxiliary brakes including: • Cleaning components, measuring, visual inspection, assess, testing • Adjusting and servicing • Road testing, engine testing, pressure testing, electrical testing • Tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to operational data as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3810A Carry out oxy acetylene welding, thermal cutting and thermal heating procedures

Unit descriptor

This unit covers the competency to carry out welding, thermal cutting and thermal heating procedures appropriate to the repairs conducted in the retail, service and repair streams.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out oxy acetylene welding procedures	2.1 Welding procedures are completed without causing damage to any component or system
	2.2 Information is accessed from appropriate sources to enable welding to be performed in accordance with vehicle and equipment manufacturer/component supplier procedures
	2.3 Welding is carried out according to a standard that meets industry regulations/guidelines, OH&S legislation, legislation and enterprise policy/procedures
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and workplace procedures

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment (continued)	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Oxy welding, cutting and heating

- Equipment to include welding, cutting and measuring
- Material may include steel, Oxy Acetylene Gas, aluminium, tubing, cast iron

Unit scope

- Work involves cutting, welding and heating

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, oxy welding and thermal cutting and heating procedures, environmental issues, repair procedures and vehicle operational requirements
- Competency may be demonstrated in workplaces involved in welding and fabrication, roadside service, dealership, panel repairs, detailing, dismantling, accessory fitting, workshops

Tools and equipment

- Tools and equipment are to include may include, but not be limited to:
  - Hand tools, welding equipment, thermal cutting equipment and thermal heating equipment
  - Other resources may include: measuring equipment, marking out equipment and lifting equipment

Material

- Material are to include: oxy acetylene Gas, welding rods, marking chalk

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including:
  - job sheets
  - Vehicle manufacturer/component supplier specifications
  - Enterprise operating procedures
  - Component manufacture specifications
  - Customer requirements
  - Industry/workplace codes of practice
  - Legislation for vehicle road worthiness including Australian Design Rules
  - Material safety data sheets
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment.
- Read and interpret communication procedural information from job sheets to prepare for work.
- Identify material used in the work process

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
- Maintain required production output and product quality
- Identify, set up, operate and maintain oxy welding, lifting and measuring equipment.
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Welding, thermal cutting and heating.
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels to be considered as per job sheet and manufacturer/component supplier specification. OH&S regulations/requirements
  - Equipment safety requirements
  - Personal safety requirements (eg, toxic fumes/lead poisoning)
  - Types of metals relevant to application
  - Welding procedures (Oxy)
  - Thermal cutting procedures
  - Thermal heating procedures
  - Types of flux, rod and their applications
  - Equipment maintenance procedures
  - Planning of oxy
  - Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to oxy welding, thermal cutting and thermal heating (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to:

- Access, interpret and apply technical information
- Use relevant tools and equipment
- Application of personal safety requirements
- Application of oxy acetylene/welding procedures
- Application of thermal cutting procedures
- Application of thermal heating procedures.

Including tools and equipment

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to vehicle and manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3811A Carry out manual metal arc welding procedures

Unit descriptor

This unit covers the competency to carry out manual metal arc welding procedures conducted in the automotive streams.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out manual metal arc procedures	2.1 Manual metal arc welding procedures are completed without causing damage to any component or system
	2.2 Information is accessed from appropriate sources to enable welding to be performed in accordance with vehicle and equipment manufacturer/component supplier procedures
	2.3 Approved methods and equipment, according to type of material and repairs required
	2.4 Manual metal arc welding is carried out according to a standard that meets industry regulations/guidelines, OH&S requirements and enterprise policy/procedures

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Manual arc welding

- Equipment to include manual arc welding, measuring and lifting

Unit scope

- Work involves manually arc welding of components and equipment

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, manual arc welding procedures, environmental issues, repair procedures and vehicle operational requirements
- Competency may be demonstrated in workplaces involved in welding and fabrication, roadside service, dealership, panel repairs, detailing, dismantling, accessory fitting, workshops

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include but not be limited to:hand tools, welding equipment including manual metal arc welding machines, rods and safety equipment, measuring equipment, marking out equipment and lifting equipment

Material

- Material are to include arc welding electrodes

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including:
  - Job sheets
  - Vehicle manufacturer/component supplier specifications
  - Enterprise operating procedures
  - Component manufacture specifications
  - Customer requirements
  - Industry/workplace codes of practice
  - Legislation for vehicle roadworthiness including Australian Design Rules
  - Material safety data sheets
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures.

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information from job sheets to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain arc welding, lifting and measuring equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

The types, characteristics, uses and limitations of:

- OH&S regulations/requirements
- Equipment safety requirements
- Personal safety requirements (e.g. toxic fumes/lead poisoning)
- Types of metals relevant to application
- Types of electrodes and their application
- Manual metal arc welding procedures
- General knowledge of common automotive terminology
- Equipment maintenance procedures
- Planning of arc welding processes and techniques

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels to be considered as per job sheet and manufacturer/ component supplier specification
- Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to manual arc welding work orders, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 2)
Use technology	Use the workplace technology related to: • Access, interpret and apply technical information • Use relevant tools and equipment • Application of personal safety requirements • Application of manual metal arc welding Including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to vehicle and manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3813A Carry out gas metal arc (MIG) welding procedures

Unit descriptor

This unit covers the competency to carry out gas metal arc (MIG) welding procedures appropriate to the repairs conducted in the retail, service and repair streams.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out Gas Metal Arc (MIG) welding procedures	2.1 Gas Metal Arc (MIG) welding procedures are completed without causing damage to any component or system
	2.2 Information is accessed from appropriate sources to enable welding to be performed in accordance with vehicle and equipment manufacturer/component supplier procedures
	2.3 MIG welding is carried out according to a standard that meets industry regulations/guidelines, OH&S requirements, legislation and enterprise policy/procedures
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

MIG welding

- Equipment to include MIG welders
- Material – MIG welding wire and gas

Unit scope

- Work involves gas metal arc (MIG) welding methods and preparation

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, MIG welding procedures, environmental issues, repair procedures and vehicle operational requirements
- Competency may be demonstrated in workplaces involved in welding and fabrication, roadside service, dealership, panel repairs, accessory fitting, workshops

Tools and Equipment

- Tools and equipment are to include but not be limited to:
  - Hand tools, MIG welding machines, and safety equipment
  - Other resources may include: measuring equipment, marking out equipment and lifting equipment

Material

- Material are to include MIG welding wire and CO_2 gas

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment.
- Work instructions, including:
  - Job sheets
  - Vehicle manufacturer/component supplier specifications
  - Enterprise operating procedures
  - Component manufacture specifications
  - Customer requirements
  - Industry/workplace codes of practice
  - Legislation for vehicle road worthiness including Australian Design Rules
  - Material safety data sheets
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information from job sheets to prepare for work
- Identify material used in the work process

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain MIG welding, lifting and measuring equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - OH&S requirements
  - Equipment safety requirements
  - Personal safety requirements (e.g. toxic fumes/lead poisoning)
  - Types of metals (MIG)
  - Types of MIG welding wire and their application
  - Planning of MIG welding processes and techniques
  - Equipment maintenance procedures
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels to be considered as per job sheet and manufacturer/component supplier specification
  - Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to MIG welding work orders, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to

- Access, interpret and apply technical information
- Use relevant tools and equipment
- Application of personal safety requirements
- Application of Gas Metal Arc (MIG) welding procedures

Including tools and equipment.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to vehicle and manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3814A Carry out gas tungsten arc (TIG) welding procedures

Unit descriptor

This unit covers the competency to carry out Gas Tungsten Arc (TIG) welding procedures appropriate to the repairs conducted in the retail, service and repair streams.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out Gas Tungsten Arc (TIG) welding procedures	2.1 Gas Tungsten Arc (TIG) welding procedures are completed without causing damage to any component or system
	2.2 Information is accessed from appropriate sources to enable welding to be performed in accordance with vehicle and equipment manufacturer/component supplier procedures
	2.3 TIG welding is carried out according to a standard that meets industry regulations/guidelines, OH&S requirements, legislation and enterprise policy/procedures
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment (continued)	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

TIG welding

- Equipment to include TIG welders
- Material to include Argon gas, filling rods

Unit scope

- Work involves preparation, selection, measuring of material and TIG welding

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, gas tungsten arc welding procedures, environmental issues, repair procedures and vehicle operational requirements
- Competency may be demonstrated in workplaces involved in welding and fabrication, roadside service, dealership, panel repairs, accessory fitting, workshops

Tools and equipment

- Tools and equipment are to include but not be limited to:
  - Hand tools, TIG welding machines, rods and safety equipment
  - Other resources may include: measuring equipment, marking out equipment and lifting equipment

Material

- Material are to include Argon gas and filling rods

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including:
  - Job sheets
  - Vehicle manufacturer/component supplier specifications
  - Enterprise operating procedures
  - Component manufacture specifications
  - Customer requirements
  - Industry/workplace codes of practice
  - Legislation for vehicle roadworthiness including Australian Design Rules
  - Material safety data sheets
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information from job sheets to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Identify, set up, operate and maintain TIG welding, safety, lifting and measuring equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - OH&S requirements
  - Equipment safety requirements
  - Personal safety requirements (e.g. toxic fumes/lead poisoning)
  - Types of metals
  - Types of fluxes, rods and their application
  - Planning of TIG welding processes and techniques
  - Equipment maintenance procedures
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels to be considered as per job sheet and manufacturer/component supplier specification.
  - Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to TIG welding work orders, plans and safety procedures.

(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 2)
Use technology	Use the workplace technology related to: • Access, interpret and apply technical information • Use relevant tools and equipment • Apply personal safety requirements • Apply Gas Tungsten Arc (TIG) welding procedures Including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to vehicle and manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3815A Carry out spot welding procedures

Unit descriptor

This unit covers the competency to carry out spot welding procedures appropriate to the repairs conducted in the retail, service and repair streams.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including job sheets, quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for repairs and replacements are selected and inspected for quality
	1.5 Correct hand, power tools and safety equipment for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out Spot Welding procedures	2.1 Spot welding procedures are completed without causing damage to any component or system
	2.2 Information is accessed from appropriate sources to enable welding to be performed in accordance with vehicle and equipment manufacturer/component supplier procedures
	2.3 Spot welding is carried out according to a standard that meets industry regulations/guidelines, OH&S requirements, legislation and enterprise policy/procedures
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Spot welding	• Equipment to include spot welders • Material to include steel products
Unit scope	• Work involves
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures and Australian Design Rules • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling and lifting equipment procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in lifting, safety equipment, spot welding procedures, environmental issues, repair procedures and vehicle operational requirements • Competency may be demonstrated in workplaces involved in welding and fabrication, dealership, panel repairs, accessory fitting, workshops

Tools and equipment	• Tools and equipment are to include but not be limited to:
	  • Hand tools, spot welding equipment
	  • Other resources may include: measuring equipment, marking out equipment and lifting equipment

Material	• Material are to include steel product
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including:
  - Job sheets
  - Vehicle manufacturer/component supplier specifications
  - Enterprise operating procedures
  - Component manufacture specifications
  - Customer requirements
  - Industry/workplace codes of practice
  - Legislation for vehicle roadworthiness including Australian Design Rules
  - Material safety data sheets
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret communication procedural information from job sheets to prepare for work
- Identify material used in the work process

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow work instructions, operating procedures and inspection processes to:
  - Minimise the risk of injury to self and others
  - Prevent damage and wastage of goods, equipment and products
  - Maintain required production output and product quality
- Identify, set up, operate and maintain spot welding, lifting and measuring equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - OH&S requirements
  - Equipment safety requirements
  - Personal safety requirements (e.g. toxic fumes/lead poisoning)
  - Types of metals
  - Spot welding equipment, types and applications
  - Planning of spot welding processes and techniques
  - Equipment maintenance procedures
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels to be considered as per job sheet and manufacturer/component supplier specification.
  - Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to spot welding work orders, plans and safety procedures. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to

- Access, interpret and apply technical information
- Use relevant tools and equipment
- Application of personal safety requirements
- Application of spot welding procedures

Including tools and equipment.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to vehicle and manufacturer/component supplier specifications as identified in the Range Statement, standard operating procedures

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3830A Install gas fuel systems (LPG)

Unit descriptor

This unit covers the competency to access information to obtain the correct system, install, test and commission the system.

Systems Definition: Liquefied Petroleum Gas (LPG)

Prerequisites:

AURT2832A Service gas fuel systems

AURT3833A Repair gas fuel systems

State/Territory Legislation requirements for registration

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment quantities and installation manuals
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including personal protection needs, are observed throughout the work
2. Install Liquid Petroleum Gas (LPG) fuel systems	2.1 Liquid Petroleum Gas (LPG) fuel systems installation is completed without causing damage to any component system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specification
	2.3 LPG fuel system installation is carried out in accordance with vehicle/system manufacturer/component supplier specifications for methods, equipment used and tolerances relative to the vehicle/system
	2.4 Appropriate workplace documentation is completed and dealt with relevant to installation outcomes
	2.5 Installation activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment (continued)	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Vehicles presented for LPG fitting	• The installation of Liquefied Petroleum Gas (LPG) fuel systems to light, heavy vehicles, vessels, outdoor power equipment and forklift trucks
Unit scope	• Work involves measuring, visual inspection, assembling, testing. Methods should be applied under normal operating conditions
Unit context	• OH&S requirements include Australian Standards, safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in installation of LPG systems
	• Competency may be demonstrated in workplaces involved in the installation of LPG fuel supplies
Tools and equipment	• Tools and equipment are to include gas leakage testing equipment, hand tools, power tools and component attaching equipment, exhaust gas analyser, cleaning equipment
Material	• Material are to include LPG fitment kits, LPG, fasteners, paint and cleaning material
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices, footwear, clothing and gloves

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, fitting instructions, material safety data sheets and service manuals
- Workplace procedures relating to reporting and communication including maintaining customer records
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret installation instructions, job sheets, material safety data sheets and service manuals
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain LPG fitting cleaning and testing equipment
- Conduct operator maintenance on LPG installation equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Installation procedures
  - Testing and commissioning procedures
  - Equipment/material safety requirements
  - Personal safety requirements
  - Legislation where applicable
  - Industry codes of practice
  - Australian Standards – AS1425, AS2739, AS2746
  - Manual handling procedures
  - Planning correct processes and techniques for installing, testing and commissioning LPG systems
  - Workplace guidelines regarding Australian Standards
  - Workplace safety policies and procedures
  - Procedures for reporting equipment faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to installing LPG systems, work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and cleaning problems, avoid re working and avoid wastage. (Level 2)
Use technology	Use the workplace technology related to installing LPG systems including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to vehicle for installation of LPG systems as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and may include electronic, verbal, written or questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3831A Install gas fuel systems (CNG/NGV)

Unit descriptor

This unit covers the competency to access information to obtain the correct system, install, test and commission the system.

Systems Definition: Compressed Natural Gas (CNG)

Natural Gas Vehicle (NGV)

Prerequisites:

AURT2832A Service gas fuel systems

AURT3833A Repair gas fuel systems

State/Territory Legislation requirements for registration

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment quantities and installation manuals
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
2. Install Compressed Natural Gas (CNG)/ Natural Gas Vehicle (NGV) fuel systems	2.1 Natural Gas (CNG)/Natural Gas Vehicle (NGV) fuel systems installation is completed without causing damage to any component system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specification
	2.3 CNG/NGV fuel system installation is carried out in accordance with vehicle/system manufacturer/component supplier specifications for methods, equipment used and tolerances relative to the vehicle/system
	2.4 Appropriate workplace documentation is completed and dealt with relevant to installation outcomes
	2.5 Installation activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment (continued)	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Vehicles presented for CNG/NGV fitting	• The installation of Natural Gas (CNG)/ Natural Gas Vehicle (NGV) fuel systems to light, heavy vehicles, vessels, out door power equipment and fork lift trucks
Unit scope	• Work involves measuring, visual inspection, assembling, testing. Methods should be applied under normal operating conditions
Unit context	• OH&S requirements include Australian Standards, safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in installation of CNG/NGV systems
	• Competency may be demonstrated in workplaces involved in the installation of CNG/NGV fuel supplies
Tools and equipment	• Tools and equipment are to include gas leakage testing equipment, hand tools, power tools and component attaching equipment, exhaust gas analyser, cleaning equipment
Material	• Material are to include CNG/NGV fitment kits, CNG/NGV, fasteners, paint and cleaning material
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices, footwear, clothing and gloves

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, fitting instructions, material safety data sheets and service manuals
- Workplace procedures relating to reporting and communication including maintaining customer records
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret installation instructions, job sheets, material safety data sheets and service manuals
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain CNG/NGV fitting cleaning and testing equipment
- Conduct operator maintenance on CNG/NGV installation equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Installation procedures
  - Testing and commissioning procedures
  - Equipment/material safety requirements
  - Personal safety requirements
  - Legislation where applicable
  - Industry codes of practice
  - Australian Standards – AS1425, AS2739, AS2746
  - Manual handling procedures
  - Planning correct processes and techniques for installing, testing and commissioning CNG/NGV systems
  - Workplace guidelines regarding Australian Standards
  - Workplace safety policies and procedures
  - Procedures for reporting equipment faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to installing CNG/NGV systems, work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and cleaning problems, avoid re working and avoid wastage. (Level 2)
Use technology	Use the workplace technology related to installing CNG/NGV systems including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to vehicle for installation of CNG/NGV systems as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and may include electronic, verbal, written or questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT3835A Repair gas fuel systems (CNG/NGV)

Unit descriptor

This unit covers the competency to repair CNG/NGV fuel systems, remove and replace/repair components, and test and recommission system.

Systems Definition: Compressed Natural Gas (CNG)

Natural Gas Vehicle (NGV)

Prerequisites:

AURT2832A Service gas fuel systems

State/Territory Legislation requirements for registration

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment quantities and service manuals
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
2. Repair Compressed Natural Gas (CNG)/ Natural Gas Vehicle (NGV) fuel systems and remove and replace components	2.1 Natural Gas (CNG)/Natural Gas Vehicle (NGV) fuel systems and repair, remove and replace is completed without causing damage to any component system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specification
	2.3 CNG/NGV fuel system repair/component removal and replacement is carried out in accordance with vehicle/system manufacturer/component supplier specifications for methods, equipment used and tolerances relative to the vehicle/system
	2.4 Appropriate workplace documentation is completed and dealt with relevant to installation outcomes
	2.5 Repair/component removal and replacement activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures

ELEMENT	PERFORMANCE CRITERIA
3. Clean up work area and maintain equipment (continued)	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Vehicles presented for CNG/NGV fitting	• Repairing of Natural Gas (CNG)/ Natural Gas Vehicle (NGV) fuel systems to light, heavy vehicles, vessels, out door power equipment and fork lift trucks
Unit scope	• Work involves removing, repairing and replacing CNG/NGV components
Unit context	• OH&S requirements include Australian Standards, safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in diagnoses of CNG/NGV supply components
	• Competency may be demonstrated in workplaces involved in the repair of CNG/NGV fuel supply components
Tools and equipment	• Tools and equipment are to include gas leakage testing equipment, hand tools, leak detector, exhaust gas analyser, pressure/vacuum gauge, multimeter and may include, but not be limited to hand held meters, computer testers, engine analysers, system testers, emission tester pressure testers
Material	• Material are to include replacement components, CNG/NGV gas testing and cleaning material
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices, footwear, clothing and gloves

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, material safety data sheets and instruction manuals
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures include:
  - Aural, visual and functional assessment (including damage, wear, corrosion, leaks and safety aspects)
  - Testing of electrical equipment/electronic components associated with CNG/NGV fuel systems repairs/removal and replacement of electrical/electronic components associated with CNG/NGV fuel systems
- Methods should be applied under normal operating conditions

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret job sheets, material safety data sheets and instruction manuals
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain CNG/NGV test and cleaning equipment

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Conduct operator maintenance on testing equipment and hand tools
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Gas fuel system construction and operation (relevant to application)
  - Repair/removal and replacement procedures
  - Gas and fuel system testing and adjustment procedures
  - Equipment/material safety requirements
  - Handling of hazardous substances
  - Personal safety requirements
  - Legislation where applicable
  - Industry codes of practice
  - Australian Standards – AS1425, AS2739, AS2746
  - Manual handling procedures
  - Planning correct processes and techniques for repairing of CNG/NGV components
  - Workplace guidelines regarding Australian Standards
  - Workplace safety policies and procedures
  - Procedures for reporting equipment faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to CNG/NGV removal, repair and replacement procedures, work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 1)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and cleaning problems, avoid re working and avoid wastage. (Level 1)
Use technology	Use the workplace technology related to CNG/NGV component repairs including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to CNG/NGV fuel vehicles and/or components as identified in the Range Statement, standard operating procedures

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and may include electronic, verbal, written or questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT4501A Plan and manage compliance with environmental regulations and best practice in the marine repair and service industry

Unit descriptor

This unit covers the competency to plan and implement an appropriate management system that ensures the protection of the environment in a marine repair and service business.

ELEMENT	PERFORMANCE CRITERIA
1. Plan and manage compliance with relevant environment regulations	1.1 Reasons for ethical environmental practice in a marine repair and/or service workshop are identified
	1.2 Environmental responsibilities of employers and employees in a marine repair and/or service workshop are identified
	1.3 Penalties for company and individual breaches of the legislation are identified
	1.4 Waste products are minimised and facilities are provided for waste material including biological material (marine biota) to be stored for recycling or disposal
	1.5 Collection and recycling arrangements are sourced and implemented for liquids, sludge, solids and other waste
	1.6 Suppliers with minimal excess packaging on goods received are sourced. Packaging on goods received is sorted and disposed of appropriately
	1.7 Waste and energy conservation strategies are identified and implemented
2. Manage potential hazards to stormwater systems, foreshores and marine environments to avoid contamination	2.1 Systems are in place to ensure waste water or contaminants do not enter stormwater systems, foreshores or marine environments
	2.2 All drains and flows are identified on a site map directly indicating where they flow
	2.3 Appropriate trade waste permits are in place
	2.4 Ensure that slipways and hardstand areas are fitted with a containment system that prevents wastewater from entering the stormwater systems, foreshores and the marine environment

ELEMENT	PERFORMANCE CRITERIA
2. Manage potential hazards to stormwater systems, foreshores and marine environments to avoid contamination (continued)	2.5 Undercover, bunded and/or graded areas are provided and used for surface cleaning and preparation and the storage of all parts and components containing environmentally hazardous material
	2.6 Clearly identified storage or recycling containers are provided for all liquid wastes
	2.7 Oil separator and pits are cleaned and maintained as per manufacturer/component supplier specifications
	2.8 An appropriate system is sourced and implemented for the disposal of bilge water
	2.9 Spill kit is provided and used as needed by staff trained in its use to prevent the contamination of stormwater systems, foreshores and marine environments
	2.10 Workplace is kept clean to prevent unintentional pollution of stormwater systems, foreshores and marine environments
3. Manage potential hazards to air quality to avoid contamination	3.1 Activities generating fine particles in particular anti-foulant or other deleterious material removal are identified, minimised and contained
	3.2 A slipway, hardstand or approved method/area is provided for abrasive sanding activities
	3.3 An undercover and well ventilated area is provided for fibreglassing
	3.4 Identify whether an approved spray booth is necessary for surface coating operations and if so ensure that it is properly maintained
	3.5 A well ventilated room is provided for paint preparation
	3.6 A well ventilated area is proved for any welding activities
	3.7 Hazards of gases and fumes are identified, minimised and contained
	3.8 Clean-up of guns and general tools and equipment is conducted in an environmentally safe manner
4. Minimisation of noise hazards is planned and managed	4.1 Noise generating activities are minimised and carried out within approved operating hours
	4.2 Fixed machinery has silencers fitted or is contained within a noise minimisation structure

ELEMENT	PERFORMANCE CRITERIA
5. Management systems	5.1 An environmental policy and contingency plan suitable to the needs of the business is developed and implemented
	5.2 Waste to landfill is calculated and possible savings through reuse and recycling are calculated
	5.3 Payback period on environmental equipment is calculated
	5.4 Manage staff adherence to environmental responsibilities
	5.5 Environmental records are accurately and legibly maintained and stored securely in a form accessible for reporting procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Marine repair and service workshop

- Marine workshop undertaking the repair or service of marine vessels and marine components

Unit scope

- Work involves the planning and management of normal activities of a marine repair and service workshop including:
  - the installation, removal, repair, testing and replacement of marine craft engines and associated components
  - the installation, removal, repair, testing and replacement of marine electrical systems and components
  - welding, soldering and thermal cutting of marine components
  - water testing
  - cleaning and washing of external and internal surfaces including glass and wet areas and
  - the removal and preparation of vessel surfaces and components for painting with anti-foulant based products
- This unit is applicable to marine stream qualifications at both Certificate IV and Diploma level.

RANGE STATEMENT

Unit context

- OH&S requirements include safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, environmental legislation, Australian standards, relevant OH&S, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills to improve environmental performance by reducing environmental risk and waste
- Competency may be demonstrated in workplaces involved in the repair and service of marine vessels

Tools and equipment

- Tools and equipment are to include spill kits, recycling bins and drums, parts washers, bunded/graded wash bays, air extraction equipment, slipways or hardstand areas with pollution control measures and diversion valves, an oil water separator, a containment area for hazardous substances and a waste water management system

Material

- Material safety data sheets, manufacturer/component supplier specifications, environmental records and costings of equipment

  And may include staff environmental induction material.

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Environmental legislation, regulations and advice
- Workplace procedures relating to the use of tools and equipment
- Work instructions and procedures
- Site environmental policy
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures
- Local council and waterways regulations

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Plan and manage safe handling requirements for equipment, products and material, including use of personal protective equipment
- Plan and manage environmental protection procedures in the business
- Identify material used in the repair and service process and assess and manage their environmental impact
- Effective recycling processes are in place
- Plan and manage work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - maintain a clean workplace
  - prevent damage and wastage of goods, equipment and products
  - dispose of waste in accordance with legislative requirements and best practice
  - maintain required production output and product quality
- Report significant environmental damage or spills
- Plan and manage operator maintenance on tools and equipment to ensure environmental efficiency
- Plan and manage operator maintenance on spray booth and spray equipment is conducted where applicable, to ensure environmental efficiency
- Manage effective planning and team work related to environmental best practice
- Develop/implement or audit an existing business environmental policy which covers at a minimum; waste, recycling, hazards to stormwater, air quality, noise, energy minimisation and costs
- Modify activities to cater for variations in workplace context and the environment

EVIDENCE GUIDE

Underpinning knowledge

- Relevant aspects of environmental legislation and its relationship with OH&S, financial and risk management
- Requirements for trade waste permits
- Spill clean up procedures
- Characteristics and potential environmental impact of products used in the repair and service of marine vessels
- Philosophy of sustainability through prevent, reduce, reuse and recycle
- Procedures for rectifying machinery faults and material defects
- Action to be undertaken in case of significant environmental threat in the workplace
- Reporting procedures for significant environmental damage occurring in the workplace
- Awareness of the environmental effects of tributylin, arsenic, mercury, copper, lead, hydrocarbons, oil/oily water and DDT on marine environments
- Cleaner production and eco-efficient strategies to avoid the production of waste

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to environmental procedures from legislation, regulations, policies, guidelines, standards and workplace best practices in a marine repair and service business. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable all work undertaken is in accordance with environmental best practice. Support from stakeholders is actively sought for implementing suitable innovation and continuous improvement. (Level 3)
Plan and organise activities	Plan and organise activities including the preparation of equipment and material, recycling and waste management system and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Promote work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements and calculate wastage rates of various methods. (Level 3)
Solve problems	Use planning, checking and inspection techniques to avoid environmental contamination and wastage. (Level 3)
Use technology	Use the workplace technology related to environmental protection and recycling equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a marine repair and service workshop with access to marine vessels or components requiring repair, maintenance, testing or installing of components and/or systems, parts washers, recycling bins, bunded/graded wash bays, oil water separator liquid, sludge and solid wastes. Resources may include pressure washing and facilities for the use of recycled water.

EVIDENCE GUIDE

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a component authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT4502A Plan and manage compliance with environmental regulations and best practice in the mechanical repair industry

Unit descriptor

This unit covers the competency to plan and implement an appropriate management system that ensures the protection of the environment in a mechanical repair business.

ELEMENT	PERFORMANCE CRITERIA
1. Plan and manage compliance with relevant environment regulations	1.1 Reasons for ethical environmental practice in an automotive workplace or business are identified
	1.2 Environmental responsibilities of employers and employees in an automotive workplace or business are identified
	1.3 Penalties for company and individual breaches of the legislation are identified
	1.4 Waste products are minimised and facilities provided for waste material to be stored in appropriate bins for recycling or disposal
	1.5 Collection and recycling arrangements are implemented for liquids, sludge, solids and other waste
	1.6 Suppliers with minimal excess packaging on goods received are sourced. Packaging on goods received is sorted and disposed of appropriately
	1.7 Waste and energy conservation strategies are identified and implemented
2. Manage potential hazards to stormwater systems to avoid contamination	2.1 Systems are in place to ensure waste water does not enter the stormwater system
	2.2 All drains and flows are identified on a site map or directly indicating where they flow
	2.3 Appropriate trade waste permits are in place
	2.4 Impervious paved, undercover and bunded or drained area(s) are provided and used for all surface cleaning and preparation
	2.5 Undercover and bunded or drained areas are provided and used for the storage of all material, parts and components containing environmentally hazardous substances
	2.6 Clearly identifiable storage or recycling containers are provided for all liquid wastes

ELEMENT	PERFORMANCE CRITERIA
2. Manage potential hazards to stormwater systems to avoid contamination (continued)	2.7 Oil water separator and pits are cleaned and maintained regularly as per manufacturer/component supplier specifications
	2.8 Approved parts washer is supplied and maintained in a manner that ensures no contamination occurs
	2.9 Spill kit is provided and used as needed to prevent stormwater contamination by staff trained in its use
	2.10 Workplace is kept clean to prevent unintentional stormwater pollution
3. Manage potential hazards to air quality to avoid contamination	3.1 Hazards to air borne particles are identified, minimised and contained
	3.2 Hazards to gases and fumes are identified, minimised and contained
	3.3 Systems are in place and implemented to ensure vehicle exhausts and emissions are minimised are not permitted to collect in the workplace
	3.4 A well ventilated area is provided for any welding activities
4. Minimisation of noise hazards is planned and managed	4.1 Noise creating activities are minimised and carried out within approved operating hours
	4.2 Fixed machinery is fitted with silencers or surrounded by noise containment material
5. Management systems	5.1 An environmental policy and contingency plan suitable to the needs of the business is developed and implemented
	5.2 Waste to landfill is calculated and possible savings through reuse and recycling are calculated
	5.3 Payback period on environmental equipment is calculated
	5.4 Manage staff adherence to environmental responsibilities
	5.5 Environmental records are accurately and legibly maintained and stored securely in a form accessible for reporting procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Automotive business	• Mechanical workplace or business undertaking either general or specialist mechanical repairs to; light or heavy vehicles or their mechanical components, or motorcycles or outdoor power equipment. Specialised mechanical repairs can include transmissions, steering and suspension, brakes, engine reconditioning, diesel fuelled plant, exhausts and radiators • This Unit is applicable to mechanical repairs which involve the removal of components containing oils or other fluids. Other mechanical stream qualifications should use AURC2501A
Unit scope	• Work involves the planning or management of normal activities in a mechanical or mechanical specialist workplace or business including service, removal, repair or fitting of mechanical components for light vehicles, heavy vehicles, motorcycles, plant and outdoor power equipment • This unit is applicable to mechanical stream qualifications at both the certificate IV and Diploma level
Unit context	• OH&S requirements include material safety data sheets, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills to improve environmental performance by reducing environmental risk and waste • Competency may be demonstrated in any mechanical workplace or business

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include spill kits, recycling bins and drums, bunded or drained wash bays and preparation areas, parts washers, quick break degreasing compounds, waste water management system
- Tools and equipment may include containment facilities for hazardous substances and staff environmental induction material

Material

- Material safety data sheets, manufacturer/component supplier specifications, environmental records, costings of equipment and waste removal

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Environmental legislation, regulations and advice
- Workplace procedures relating to the use of tools and equipment
- Work instructions and procedures
- Site environmental policy
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures.
- Local council and waterways regulations

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Plan and manage safe handling requirements for equipment, products and material, including use of personal protective equipment
- Plan and mange environmental protection procedures in the business
- Identify material used in process in the business, assess and manage their environmental impact
- Effective recycling processes are in place
- Plan and manage work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - maintain a clean workplace
    - prevent damage and wastage of goods, equipment and products
    - dispose of waste in accordance with legislative requirements and best practice
    - maintain required production output and product quality
    - Report significant environmental damage or spills
- Plan and manage operator maintenance on equipment to ensure environmental efficiency
- Manage effective planning and team work related to environmental best practice
- Develop/implement or audit an existing business environmental policy which covers at a minimum: waste, recycling, hazards to stormwater, air quality, noise, energy minimisation and costs
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Relevant aspects of environmental legislation and its relationship with OH&S, financial and risk management
- Requirements for trade waste permits
- Spill clean up procedures
- Characteristics and potential environmental impact of products used in the business
- Philosophy of sustainability through prevention, reuse, reduce, recycle
- Procedures for rectifying machinery faults and material defects
- Action to be taken in case of significant environmental threat in the workplace
- Reporting procedures for significant environmental damage occurring in the workplace
- Cleaner production and eco-efficient strategies to avoid the production of waste

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to environmental procedures from legislation, regulations, policies, guidelines, standards and workplace best practices in an automotive mechanical business. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable all work undertaken is in accordance with environmental best practice. Support from stakeholders is actively sought for implementing suitable innovation and continuous improvement. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the preparation of equipment and material recycling and waste management systems and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Promote work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements and calculate wastage rates of various methods. (Level 3)
Solve problems	Use planning, checking and inspection techniques to avoid environmental contamination and wastage. (Level 3)
Use technology	Use the workplace technology related to environmental protection and recycling equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to an automotive mechanical workplace or business with a range of vehicles or mechanical components, waste material of various types, recycling bins, spill kits, quick break degreasing agents, oil/water separator for liquids, sludge, solids and other waste

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Method of assessment (continued)

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a component authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5775A Prepare technical reports

Unit descriptor

This unit covers the competency to identify and analyse requirements, to plan and conduct research, to evaluate information and findings, and to develop, document and present technical reports.

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the reporting requirement	1.1 The purpose or objective of the report is identified, clearly defined and confirmed as necessary with the client or sponsor
	1.2 The project timeline and outline plan of the main activities are prepared and confirmed as necessary with key parties
	1.3 Requirements for information entry, storage, output and quality of document production are identified in accordance with enterprise procedures
2 Plan the research effort	2.1 The scope and nature of the information requirements are identified
	2.2 All possible sources of the required information are researched and identified
	2.3 A systematic research or information collection plan is designed to optimise the process
	2.4 Resources are obtained and scheduled to service the research requirements
3 Conduct research	3.1 Research is undertaken effectively in accordance with the plan
	3.2 Experiments and tests to support the research effort are conducted in a manner which ensures the demonstrable integrity of the outcomes or findings
	3.3 Research findings are accurately logged, documented and stored to maintain traceability
	3.4 Preliminary analysis is conducted to identify requirements for variations or additions to the research plan

ELEMENT	PERFORMANCE CRITERIA
4 Analyse the information	4.1 All information is sorted, documented and prepared for the analytical process
	4.2 Information and data is manipulated to enable reasonable comparisons and judgements
	4.3 Clarification by way of expert advice and opinion is sought
	4.4 The conclusions and findings reached are logical and based on objective analysis of the available data
5 Prepare and present the report	5.1 The report clearly defines the objective, the process, the findings and further actions
	5.2 The report addresses and satisfies the stated objective and timeline
	5.3 The report and any associated presentation material are of a standard and quality appropriate for the intended audience
	5.4 Reader comprehension of the report is aided by appropriate use of executive summaries and attachments
	5.5 Protocols, conventions and legal requirements related to acknowledgements and intellectual property are applied
	5.6 Information management requirements including recording and repository actions are satisfied in accordance with enterprise procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- This unit covers the competency to identify and analyse requirements, to plan and conduct research, to evaluate information and findings, and to develop, document and present technical reports
- A technical report is one that researches, analyses and reports on the specifications and/or effectiveness of existing or proposed technical systems, componentry, material and/or processes

RANGE STATEMENT

Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods codes and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, authorised handling procedures and organisation insurance requirements • Work requires individuals to demonstrate conceptual ability, discretion, judgement and problem solving skills
Workplace environment	• Work may involve individual and team related activities • Work may be carried out in a commercial, workshop, laboratory or research establishment
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to reporting and communication • Vehicle industry publications related to emerging system technology and technology changes • Professional publications • Automotive research collections and access facilities • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to systems • Australian standards • Australian Design Rules • Vehicle Industry Regulations

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Locate, interpret and apply relevant information
- Apply safety requirements throughout the work sequence, including the use of personal protective clothing and equipment
- Identify and itemise steps and stages covering confirmation of objective, research planning and conduct and report preparation
- Complete a significant technical report covering:
  - detailed research of the topic area
  - a full analysis of the research outcomes
  - conclusions and recommendations which are clearly supported by the facts
  - satisfaction of legal, regulatory or intellectual property law requirements
- Modify activities to cater for variations in research findings
- Work effectively with others

Underpinning knowledge

- Technical writing and presentation techniques
- Enterprise (or equivalent) technical procedure formats, content rules, preparation and management techniques

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise Information

Research, collect, organise and understand technical information related to the subject area, developmental activities, testing processes, diagnostic methods and options and safety procedures.

(Level 3)

EVIDENCE GUIDE

Underpinning skills)continued)

Communicate ideas and information	Communicate ideas and information to ensure the completeness, clarity and comprehension of the technical report by the target audience. (Level 2)
Plan and organise activities	Plan and organise the research and writing effort to avoid any back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise research and writing. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly incorporate calculation, measurements, calibration and test requirements into research and validation activities. (Level 3)
Solve problems	Establish processes which anticipate and allow for risks, cater for both direct and indirect causes, avoid or minimise reworking and avoid wastage in the research and report preparation activities. (Level 3)
Use technology	Use the workplace technology related to document preparation including computing systems and information management systems, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a significant technical research and reporting requirement, information sources and an appropriate working environment
Method of assessment	• Assessment of this competency is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include acceptance of the final outcome/report by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other projects
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated activity

AURT4770A Analyse and evaluate gas fuel system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate gas fuel systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning gas fuel systems are accessed and interpreted
	1.3 OH&S requirements, including regulatory requirements, equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/ component supplier and enterprise requirements Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.5 Gas fuel system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Gas fuel system faults covered by this unit are to include direct failures in safety systems, electrical systems, fuel delivery system, sequential vapour injection, fuel container, calibration and adjustment specifications, component specifications, component assembly, system modifications
- Gas fuel system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit context

- OH&S requirements, vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluative criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

RANGE STATEMENT

Isolation procedures	• Equipment isolation procedures are to regulatory, industry and enterprise standards
Testing equipment	• Testing equipment is to include multi-meters, data scanners, and test lights, pressure/vacuum gauges, water and mercury manometers, electronic leak detectors, engine tune oscilloscopes, four gas engine analyser, exhaust pressure gauge and may include other manufacturer testing equipment
Tests	• Tests to be conducted are to include liquid and vapour pressure, leakage, operation of all safety components and systems, electrical control systems, exhaust emissions, engine performance, gas system performance and data interpretation and readings related to direct, indirect and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to gas fuel systems • Australian Design Rules statutory • Gas Fuel System Regulations • Vehicle Industry Publications related to emerging gas fuel system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Correctly diagnose gas fuel system faults, including one fault from each category listed below:
  - poor engine performance
  - increased emission levels
  - impact of a prior system modification
  - incorrect installation of the gas system, and
  - one caused by an influence from an external system
- Accurately record and report the diagnostic process and findings and recommended rectification
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the theory of diagnosis including concept, design and planning

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of the concepts, types, functions, operations and limitations of gas fuel systems
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary gas fuel systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)

EVIDENCE GUIDE

Underpinning Skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, operational gas fuel systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5700A Analyse and evaluate light vehicle steering and suspension system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate light vehicle steering and suspension systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning light vehicle steering and suspension systems are accessed and interpreted
	1.3 OH&S requirements, including, equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/ component supplier and enterprise requirements. Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.5 Light vehicle steering and suspension system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipmentTesting equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Light vehicles are to include two wheel and four wheel drive vehicles
- Steering systems to be covered in this unit are to include mechanical and power
- Light vehicle steering failures covered by this unit are to include mechanical steering, power steering, tyre wear, driveability, vibration, directional stability, tracking, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Suspension systems are to cover coil, spring and spring leaf types
- Light vehicle suspension system failures covered by this unit are to include erratic steering, mechanical damage, sub frame alignment, component damage and systems modifications

Unit context

- OH&S, vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements

RANGE STATEMENT

Unit context (continued)	• Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluation criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include tape measure, tyre pressure gauge, string line, adjustable electronic bubble level and may include laser wheel alignment system
Tests	• Tests to be conducted are to include ball-joint wear, camber, castor, leveller operation pitman arm specifications, ride height, steering access inclination, steering linkage specification, sub frame alignment, thrust line, toe-in, toe-out turns, turning radius left/right, tyre pressures, tyre tread, wheel bearing specification
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to light vehicle steering and suspension systems • Australian Design Rules • Vehicle Industry Regulations • Vehicle Industry Publications related to emerging steering and suspension system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) different light vehicle steering and suspension systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for different light vehicle steering and suspension systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Light vehicle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Steering system theory including steering angles (camber, castor, steering access inclination, toe-in and toe-out)
- The functions of hydraulic pressure with steering and suspension systems
- Detailed knowledge of the types, function, operations and limitations of light vehicle manual steering systems/ components
- Detailed knowledge of the types, function, operations and limitations of light vehicle power steering systems/components
- Detailed knowledge of the types, function, operations and limitations of light vehicle suspension systems/components
- General knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary light vehicle steering and suspension systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipmentand material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, light vehicle steering and suspension systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5701A Analyse and evaluate light vehicle driveline system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate light vehicle driveline systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning light vehicle driveline systems are accessed and interpreted
	1.3 OH&S requirement including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Light vehicle driveline system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters, or to enhance system performance
- Light vehicles are to include two wheel and four wheel drive vehicles
- Driveline systems are to cover all sub-systems and components including clutches, torque converters, manual transmissions (including electric and clutchless), automatic transmissions, drive shafts and final drives
- Diagnosis is to cover that for module and parts replacement in related electrical and electronic control systems
- Driveline system failures covered by this unit are to include abnormal gear wear, abnormal clutch operations, contamination, hard shifting, harshness, loose mountings, leaks, lubrication, noises, transmission slippage, vibrations
- Driveline system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, OH&S, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are to be judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures to industry and enterprise standards
Testing equipment	• Testing equipment is to include compound levels, pressure gauges, multi-meters, tachometers and computerised diagnostic systems
Tests	• Tests to be conducted are to include lubricant inspection, pressure, road testing, sensor integrity and function, solenoid operation/function, wiring and power control ECU integrity
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to light vehicle driveline systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle Industry Regulations
- Vehicle Industry Publications related to emerging driveline system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) light vehicle driveline systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for light vehicle driveline systems
- Accurately record and report the diagnostic process and findings and recommended rectification
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Light vehicle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Detailed knowledge of the types, function, operations and limitations of light vehicle clutch systems/ components
- Detailed knowledge of the types, function, operations and limitations of light vehicle torque converter systems/ components
- Detailed knowledge of the types, function, operations and limitations of light vehicle manual transmission systems/ components
- Detailed knowledge of the types, function, operations and limitations of light vehicle automatic transmission systems/ components
- Detailed knowledge of the types, function, operations and limitations of light vehicle drive shaft systems/components
- Detailed knowledge of the types, function, operations and limitations of light vehicle final drive systems/components
- Detailed knowledge of the types, function, operations and limitations of four wheel drive system components using transfer cases, differentials and free wheel hubs
- General knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary light vehicle driveline systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, light vehicle driveline systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5702A Analyse and evaluate light vehicle engine and fuel system faults

Unit Descriptor

This unit covers the competency to correctly analyse and evaluate light vehicle engine and fuel systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning light vehicle engines are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Light vehicle engine and fuel system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.3 Waste and scrap is removed following workplace procedures
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit Scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Engine and fuel systems are to include two-stroke, four-stroke rotary, petrol engine to 8 litres and diesel engine to 8 litres
- Engine and fuel systems to be covered in this unit are to include the engine and related fuel, ignition, intake, exhaust, lubrication and cooling systems. Systems are to include innovative engine design and ceramic engine componentry
- Engine and fuel system failures covered by this unit are to include **engine** (poor performance, excessive oil consumption, engine stoppages), **fuel** (contamination, flow, pressure, leakage), **ignition** (no-start, no-run, misfire, erratic operation, lack of power, charging), **intake** (leakage, noise, vibration, inadequate control, **exhaust** (pressure, abnormal emissions), **lubrication** (pressure, flow, leakage, abnormal engine wear, inadequate filtration, sludge formation, excessive deposits, overheating), **cooling** (overcooling, insufficient cooler flow, coolant out of specification, lack or air flow, internal corrosion), **mounting** (noise, vibration, hardness, clutch shudder, erratic transmission control)

RANGE STATEMENT

Unit Scope (continued)	• Engine and fuel system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations
Unit Context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative Criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis judged. They are to include statistically based criteria and may include other measures.
Isolation Procedures	• Equipment isolation procedures to industry and enterprise standards
Testing equipment	• Testing equipment is to include bore gauges, compression gauges, computer-based diagnostic system (direct and internet), cooling system analyser, dial gauges, exhaust gas analysers, micrometers, multi-meter, oscilloscope, pressure gauges, stethoscope, telescopic gauges, temperature gauges, tachometer, timing lights, vacuum gauges, verniers, and may include anemometer, barometer, hygrometer, specific gravity gauge
Tests	• Tests to be conducted are to include component wear analysis, compression, cylinder leakage, engine performance, exhaust gas sampling, flow, oil consumption, pressure, sample collection/ processing, specific gravity, temperature, vacuum
Personal Protective Equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and Procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to light vehicle engine and fuel systems
- Australian Design Rules
- Vehicle Industry Regulations
- Vehicle Industry Publications related to emerging steering and suspension system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical Aspects of Evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) light vehicle engine and fuel systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure

EVIDENCE GUIDE

Critical Aspects of Evidence (continued)

- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for light vehicle engine and fuel systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning Knowledge

- Light vehicle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the types, functions, operations and limitations of light vehicle engines
- Detailed knowledge of the types, function, operations and limitations of light vehicle fuel systems/components
- Detailed knowledge of the types, function, operations and limitations of light vehicle ignition systems/components
- Detailed knowledge of the types, function, operations and limitations of light vehicle intake systems/components
- Detailed knowledge of the types, function, operations and limitations of light vehicle exhaust systems/components
- Detailed knowledge of the types, function, operations and limitations of light vehicle lubrication systems/components
- Detailed knowledge of the types, function, operations and limitations of light vehicle cooling systems/components
- Detailed knowledge of the types, function, operations and limitations of light vehicle engine mounting systems/components
- General knowledge of the theory of diagnosis including concept, design and planning

EVIDENCE GUIDE

Underpinning Knowledge (continued)

- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of automotive digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning Skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary light vehicle engine and fuel systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)

EVIDENCE GUIDE

Underpinning Skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise re-working and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource Implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, light vehicle engine and fuel systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of Assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of Assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5703A Analyse and evaluate light vehicle braking system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate light vehicle braking systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning light vehicle braking systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/ component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Light vehicle braking system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Light vehicles are to include two wheel and four wheel drive vehicles
- Braking systems to be covered in this unit are to include disc, drum, ABS, AJPB, brake by wire and ceramic brakes
- Drum brakes are to include leading/trailing, twin leading, duo servo, multiple shoe variations, cast iron and aluminium brake drums
- Park brakes are to include hand, foot, electric and Banksia type
- Electronic systems are to include anti-lock braking systems and brake by wire
- Braking system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements

RANGE STATEMENT

Unit context (continued)	• Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include decelerometer, electronic brake fluid analyser, multimeter, data scanner, oscilloscopes, pressure gauges, vacuum gauge, brake tester • Testing equipment may include a chassis dynamometer
Tests	• Tests to be conducted are to include performance, brake fluid boiling point, rotor and drum wear, pad and lining thickness, brake pedal travel, handbrake mechanism travel, NVH, directional control and ABX operation and performance • Tests may include braking during cornering, friction material wear rate, disc drum and rotor temperature
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to light vehicle braking systems • Australian Design Rules • Vehicle Industry Regulations • Vehicle Industry Publications related to emerging braking system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) light vehicle braking systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for light vehicle braking systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Light vehicle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic theory covering electrics, hydraulics, friction, mechanical advantage, levers, heat, pressure, area

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Mechanical theory covering the concepts and principles of mechanical, hydraulic and electrical braking systems including performance and balance
- Functions of brake fluid
- Detailed knowledge of the types, functions, operations and limitations of light vehicle braking systems/components
- Detailed knowledge of the types, function, operations and limitations of ABS braking systems/components
- Detailed knowledge of the Australian Design Rules requirements related to light vehicle braking
- Working knowledge of the types, function, operations and limitations of light vehicle air braking (multiple trailer) systems/components
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of automotive digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary light vehicle braking systems, monitoring and testing processes, diagnostic methods and options and safety procedures.

(Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, light vehicle braking systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5710A Analyse and evaluate heavy vehicle steering and suspension system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate heavy vehicle steering and suspension systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning heavy vehicle steering and suspension systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/ component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Heavy vehicle steering and suspension system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Steering and suspension systems to be covered in this unit are to include mechanical, power and split-air suspension
- Heavy vehicle steering system failures covered by this unit are to include mechanical steering, power steering, tyre wear, driveability, vibration, directional stability, tracking, calibration/ adjustment specification, component specifications, component assembly, component damage and system modifications
- Heavy vehicle suspension system failures covered by this unit are to include erratic steering, suspension trailer influences, mechanical damage, chassis alignment, component damage and systems modifications

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

RANGE STATEMENT

Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include tape measure, tyre pressure gauge, string line, adjustable electronic bubble level and laser wheel alignment system or equivalent wheel and chassis alignment equipment
Tests	• Tests to be conducted are to include tyre pressures, tyre tread, toe-in, toe-out turns, camber, castor, king pin inclination, king pin wear, steering linkage and bar specification, axle track, average axle track, axle parallelity, chassis alignment, ride height, wheel bearing specification, drag link specifications, turning radius left/right, air bag leveller operation
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to heavy vehicle steering and suspension systems • Australian Design Rules • Vehicle Industry Regulations • Vehicle Industry Publications related to emerging steering and suspension system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) heavy vehicle steering and suspension systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for heavy vehicle steering and suspension systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Heavy vehicle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of steering system theory including steering angles (camber, castor, king pin inclination, toe-in and toe-out)
- General knowledge of the functions of hydraulic pressure within steering and suspension systems
- Detailed knowledge of the types, functions, operations and limitations of heavy vehicle steering and suspension systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle mechanical steering systems/components
- Detailed knowledge of the types and influences of single and multiple trailer operations on heavy vehicle power steering systems/components
- General knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary heavy vehicle steering and suspension systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise re-working and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, heavy vehicle steering and suspension systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment.
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority. • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances.
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines.

AURT5711A Analyse and evaluate heavy vehicle transmission system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate heavy vehicle transmission systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning heavy vehicle transmission systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/ component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Heavy vehicle transmission system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Transmission systems to be covered in this unit are to include both mechanical, automatic and integrated computer controlled systems made up of components including clutches, torque converters, automatic and manual electric transmissions, gear-boxes, differentials, drive shafts and final drives
- Transmission system failures covered by this unit are to include noises, leaks, air system pressures, contamination, clutch operation, vibrations, hardshifting, abnormal gear wear, loose mountings, lubrication, and operating temperature
- Diagnosis for module and parts replacement in related electrical and electronic control systems are covered
- Transmission system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements

RANGE STATEMENT

Unit context (continued)	• Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures.
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include pressure gauges, multi-meters, inclinometer (electronic) and computerised diagnostic systems
Tests	• Tests to be conducted are to include pressure (oil and air), lubricant sampling, sensor integrity and function, wiring harness integrity
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to heavy vehicle transmission systems • Australian Design Rules • Vehicle Industry Regulations • Vehicle Industry Publications related to emerging transmission system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) heavy vehicle transmission systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for heavy vehicle transmission systems
- Accurately record and report the diagnostic process and findings and recommended rectification
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Heavy vehicle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of the types, functions, operations and limitations of heavy vehicle manual transmission systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle automatic transmission systems/components
- General knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary heavy vehicle transmission systems, monitoring and testing processes, diagnostic methods and options and safety procedures.
	(Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, co-ordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs.
	(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using co-operative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise re-working and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, heavy vehicle transmission systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

EVIDENCE GUIDE

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5712A Analyse and evaluate heavy vehicle engine and fuel system faults

Unit Descriptor

This unit covers the competency to correctly analyse and evaluate heavy vehicle engine and fuel systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning heavy vehicle engine and fuel systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/ component supplier and enterprise requirements.
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Heavy vehicle engine and fuel system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit Scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Engine and fuel systems to be covered in this unit are to include the engine, computer controlled management systems, closed loop diesel engine management systems and related fuel, electrical, intake, exhaust, lubrication and cooling systems
- Engine and fuel system failures covered by this unit are to include engine management, engine performance (response, fuel consumption, power), charging, contamination, damaged components, emissions, forced induction, fuel pressure/supply, lighting leaks, operating temperature, overheating, sensors, starting
- Engine and fuel system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit Context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

RANGE STATEMENT

Evaluative Criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

Isolation Procedures

- Equipment isolation procedures are to industry and enterprise standards

Testing equipment

- Testing equipment is to include compression gauges, computerised diagnostic system, cooling system analyser, dynameter, manometer, multi-meter, pressure gauges, pyrometer, refractometer, temperature gauges, vacuum gauges and may include anemometer, barometer, hygrometer, specific gravity gauge

Tests

- Tests to be conducted are to include component wear analysis, compression, cylinder leakage, engine performance, exhaust gas sampling, flow, oil consumption, pressure, sample collection/ processing, specific gravity, temperature, vacuum, boost pressures

Personal Protective Equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and Procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to heavy vehicle engine and fuel systems
- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging engine and fuel system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical Aspects of Evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) heavy vehicle engine and fuel systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for heavy vehicle engine and fuel systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning Knowledge

- Heavy vehicle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems

EVIDENCE GUIDE

Underpinning Knowledge (continued)

- General knowledge of the types, functions, operations and limitations of heavy vehicle engines
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle fuel systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle engine electrical systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle intake systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle exhaust systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle lubrication systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle cooling systems/components
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of automotive digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning Skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary heavy vehicle engine and fuel systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning Skills (continued)

Use technology Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource Implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, heavy vehicle engine and fuel systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of Assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of Assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5713A Analyse and evaluate heavy vehicle braking system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate heavy vehicle braking systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning heavy vehicle engine systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/ component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Heavy vehicle braking system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Braking systems to be covered in this unit are to include foundation, ABS, ABS with traction control, air brakes (truck and trailer), air brakes (multiple trailer), compression braking, vehicle retardants, and air over hydraulic systems
- Brake timing and balancing are covered
- Braking system failures covered by this unit are to include air supply capacity, application and release times, brake balance, brake drum wear, calibration/adjustment specifications, component damage, conductors – piping specifications, contamination, friction material abnormalities, leaks, pump up times
- Braking system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

RANGE STATEMENT

Evaluative criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

Testing equipment

- Testing equipment is to include air gauges, multi-meter and Tappley meter and may include brake timer and electronic stethoscope

Tests

- Tests to be conducted are to include system performance, air supply build up time, prime mover and trailer application time, park brake application, brake fluid boiling point, rotor and drum wear, pad and lining thickness, brake pedal travel, handbrake mechanism travel, NVH, directional control, ABS operation and performance, sensor/actuator and wiring harness integrity, sampling (collection and processing) and monitoring/analysis of computer-based diagnostic systems
- Tests may also include braking during cornering, brake roller testing, friction material wear rate, disc drum and rotor temperature

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to heavy vehicle braking systems
- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging braking system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) heavy vehicle braking systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for heavy vehicle braking systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Heavy vehicle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems

EVIDENCE GUIDE

Underpinning knowledge (continued)

- General knowledge of the types, functions, operations and limitations of heavy vehicle foundation braking systems/components
- Detailed knowledge of the types, functions and limitations of friction material associated with heavy vehicle braking systems
- Detailed knowledge of the types, function, operations and limitations of ABS braking systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle air braking (truck and trailer) systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle air braking (multiple trailer) systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle air over hydraulic braking systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle compression braking systems/components
- Detailed knowledge of the types, function, operations and limitations of heavy vehicle retardant systems/components
- General knowledge of the Australian Design Rules requirements related to heavy vehicle braking
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of automotive digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary heavy vehicle braking systems, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, heavy vehicle braking systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5720A Analyse and evaluate wheeled mobile plant steering and suspension system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate mobile plant suspension system in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning wheeled mobile plant steering and suspension systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Wheeled mobile plant steering and suspension system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Wheeled mobile plant covers all mobile plant other than those with tracked undercarriage. Included are loaders, dump trucks, graders, scrapers, industrial tractors, material handling machines, agricultural harvesters and other rural equipment
- Steering systems to be covered in this unit are to include powerassisted, full hydrostatic and steer by wire systems for front, rear, all wheel drive, and articulated arrangements
- Steering failures covered by this unit are to include those to mechanical, hydraulic and electrical/electronic systems including alignment, control systems, emergency systems, tyre wear, vibration, directional stability, calibration/adjustment specifications, contamination, component specifications, component assembly, component damage and system modifications
- Suspension systems are to cover rigid frame, oscillating axles, hydrostatic, oil/gas suspension units and cushion hitch
- Suspension system failures covered by this unit are to include alignment, hydraulics, ride height, component damage and systems modifications
- Steering and suspension system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include tape measures, pressure gauges, flow meters, tyre pressure gauges, string line, multi-meter, data readers, computerised diagnostic systems and may include laser and light alignment equipment
Tests	• Tests to be conducted are to include tyre pressures, tyre tread, toe-in, toe-out, system pressures, frame alignment, ride height, wheel bearing specification, leveller operation, sensor and actuator integrity
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to wheeled mobile plant steering and suspension systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging engine and fuel system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) wheeled mobile plant steering and suspension systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for wheeled mobile plant steering and suspension systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Wheeled mobile plant terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Steering system theory including steering angles
- The functions of hydraulic pressure with steering and suspension systems
- Detailed knowledge of the types, applications and limitations of wheels and tyres used on wheeled mobile plant
- Detailed knowledge of the types, function, operations and limitations of wheeled mobile plant power assisted steering systems/components
- Detailed knowledge of the types, function, operations and limitations of wheeled mobile plant power full hydrostatic steering systems/components
- Detailed knowledge of the types and influences of trailed equipment operations on wheeled mobile plant steering performance
- Detailed knowledge of the types, function and limitations of wheeled mobile plant rigid frame suspension systems/components
- Detailed knowledge of the types, function and limitations of wheeled mobile plant oscillating axles suspension systems/components
- Detailed knowledge of the types, function and limitations of wheeled mobile plant hydrostatic suspension systems/components
- Detailed knowledge of the types, function and limitations of wheeled mobile plant oil/gas suspension systems/components
- Detailed knowledge of the types, function and limitations of wheeled mobile plant cushion hitch suspension systems/components

EVIDENCE GUIDE

Underpinning knowledge (continued)

- General knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- Detailed knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary wheeled mobile plant steering and suspension systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, wheeled mobile plant steering and suspension systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5721A Analyse and evaluate wheeled mobile plant transmission system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate wheeled mobile plant transmission systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning wheeled mobile plant transmission systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Wheeled mobile plant transmission system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Wheeled mobile plant covers all mobile plant other than those with tracked undercarriage. Included are loaders, dump trucks, graders, scrapers, industrial tractors, material handling machines, agricultural harvesters and other rural equipment
- Transmission systems to be covered in this unit are to include mechanical, power shift and automatic transmissions with integrated computer controls and the clutches, torque converters, drive lines, differentials and final drive sub-systems
- Transmission system faults covered by this unit are to include abnormal component wear, clutch operations, clutch pack slippage, contamination, drive line phasing and alignment, hard shifting, leaks, loose mountings, lubrication, modulation, noises, operating temperature, system pressures, torque converter slippage, vibrations
- Transmission system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include computer-based diagnostic systems-micrometers, multi-meters, pressure gauges, spring compression testers, tachometer, temperature gauges and verniers
Tests	• Tests to be conducted are to include component wear, lubricant sampling, operating temperature, pressure (torque converter and transmission pressure), torque converter stall, transmission clutch slippage, sensor integrity and function, wiring harness integrity, and diagnosis for module and parts replacement in related electrical and electronic control systems
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to wheeled mobile plant transmission systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging transmission system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) wheeled mobile plant transmission systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for wheeled mobile plant transmission systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Wheeled mobile plant terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Detailed knowledge of the types, functions, operations and limitations of wheeled mobile plant clutch systems/ components
- Detailed knowledge of the types, functions, operations and limitations of wheeled mobile plant torque converter systems/components
- Detailed knowledge of the types, functions, operations and limitations of wheeled mobile plant transmission systems/ components
- Detailed knowledge of the types, functions, operations and limitations of wheeled mobile plant drive line systems/ components
- Detailed knowledge of the types, functions, operations and limitations of wheeled mobile plant differential systems/ components
- Detailed knowledge of the types, functions, operations and limitations of wheeled mobile plant final drive systems/ components
- General knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary wheeled mobile plant transmission systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, wheeled mobile plant transmission systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5722A Analyse and evaluate mobile plant engine and fuel system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate mobile plant engine and fuel systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning mobile plant engine and fuel systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Mobile plant engine and fuel system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
Select response measure	3.1 Options for responding to the objective or need are identified from further research of technical support information
	3.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	3.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Mobile plant covers all mobile plant, including both wheeled and tracked undercarriage. Included are loaders, dump trucks, graders, scrapers, industrial tractors, material handling machines, agricultural harvesters and other rural equipment
- Engine and fuel systems to be covered in this unit are to include the engine and related fuel, electrical, intake, exhaust, lubrication and cooling systems
- Coverage is to include electronic monitoring, real time diagnostics, fuel monitoring, closed loop diesel engine management, advanced emission reduction technology, ceramic and other new component material and evaluation for reuse
- Engine and fuel system failures covered by this unit are to include engine and fuel management, engine performance (response, fuel consumption, power), charging, contamination, damaged components, emissions, forced induction, fuel pressure/supply, lighting leaks, operating temperature, overheating, sensors, starting
- Engine and fuel system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include compression gauges, computerised diagnostic system, cooling system analyser, dynanometer, manometer, multi-meter, pressure gauges, pyrometer, refractometer, temperature gauges, vacuum gauges and may include anemometer, barometer, hygrometer, specific gravity gauge
Tests	• Tests to be conducted are to include component wear analysis, compression, cylinder leakage, engine performance, exhaust gas sampling, lubricant sampling, oil consumption, pressure sample (intake, exhaust, crank case and turbo-charger boost), sample collection/processing, sensor and actuator integrity and function, temperature, wiring harness integrity
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to mobile plant engine and fuel systems
- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging engine and fuel system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) mobile plant engine and fuel systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for mobile plant engine and fuel systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Mobile plant terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- General knowledge of the types, functions, operations and limitations of mobile plant engines
- Detailed knowledge of the types, function, operations and limitations of mobile plant fuel systems/components including all current electronically controlled and/or actuated arrangements
- Detailed knowledge of the types, function, operations and limitations of mobile plant engine and fuel electrical systems/components
- Detailed knowledge of the types, function, operations and limitations of mobile plant intake systems/components including charge cooling and after/inter-cooling arrangements
- Detailed knowledge of the types, function, operations and limitations of mobile plant exhaust systems/components including single and multi-staged turbo charging
- Detailed knowledge of the types, function, operations and limitations of mobile plant lubrication systems/components
- Detailed knowledge of the types, function, operations and limitations of mobile plant cooling systems/components

EVIDENCE GUIDE

Underpinning knowledge (continued)

- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of automotive digital computing systems
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary mobile plant engine and fuel systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, co-ordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Work with others and in a team	Work with others and in a team by recognising dependencies and using co-operative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise re-working and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, mobile plant engine and fuel systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5723A Analyse and evaluate tracked mobile plant transmission, steering and braking system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate tracked mobile plant transmission, steering and braking systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning tracked mobile plant transmission, steering and braking systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options
	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component suppliers and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Tracked mobile plant transmission, steering and braking system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component suppliers specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component suppliers specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Steering and braking systems to be covered in this unit are to include mechanical and hydraulic operated steering clutch/brake, independent drives, planetary and differential planetary, hydrostatic drive, single and multi disc brake units
- Transmission, steering and braking failures covered by this unit are to include those to mechanical, hydraulic and electrical/electronic systems including control systems, emergency systems, directional stability, calibration/adjustment specifications, contamination, component specifications, component assembly, component damage and system modifications
- Transmission, steering system and braking failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations
- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance

RANGE STATEMENT

Unit scope (continued)	• Tracked mobile plant covers all mobile plant with tracked undercarriage. Included are tracked type loaders, crawler tractors, tracked type plant, hydraulic excavators and face shovels, material handling machines, agricultural tracked equipment and other rural equipment • Transmission systems to be covered in this unit are to include mechanical, power shift and automatic transmissions and the clutches, torque converters, drive lines, and final drive sub-systems • Coverage is to include infinitely variable transmission (belt, hydraulic and planetry)
Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include pressure and temperature gauges, flow meters, multi-meter, data readers, computer-based diagnostic systems
Tests	• Tests to be conducted are to include system pressures, flow rates, stall testing, operating temperatures, sensor and actuator integrity
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component suppliers specifications and application procedures for testing equipment and material
- Manufacturer/component suppliers specifications, schematics and operational procedures related to tracked mobile plant steering and braking systems
- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging steering and braking system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) tracked mobile plant transmission, steering and braking systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for tracked mobile plant transmission, steering and braking systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Tracked mobile plant terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- The functions of hydraulic pressure with transmission, steering and braking systems
- Detailed knowledge of tracked mobile plant transmission systems/components
- Detailed knowledge of the types, function, operations and limitations of tracked mobile plant steering and braking systems/components
- Detailed knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary tracked mobile plant transmission, steering and braking systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, tracked mobile plant transmission, steering and braking systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5724A Analyse and evaluate tracked mobile plant undercarriage and suspension system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate tracked mobile plant tracks, undercarriage and suspension systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning tracked mobile plant undercarriage and suspension systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Tracked mobile plant undercarriage and suspension system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.3 Waste and scrap is removed following workplace procedures
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Tracked mobile plant covers all mobile plant with tracked undercarriage including track type loaders, crawler tractors tracked type plant, hydraulic excavators and face shovels, material handling machines, agricultural track equipment and other rural equipment
- Track systems to be covered in this unit are to include linked, sealed and lubricated
- Undercarriage systems and components to be covered in this unit are to include rollers, idlers, frames and recoil mechanisms
- Suspension systems and components to be covered in this unit are to include rigid platform, low track, live axle, dead axle and elevated sprocket system
- Failures to be covered in this unit are to include alignment, abnormal wear, component out of specification, component damage, mechanical variations, adjustment errors, inadequate modifications
- Variations and failures covered by this unit are to include those caused by the influence of external systems which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Standards, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include callipers, infra-red temperature sensor, micrometers, profile and template gauges, tape measures, temperature measuring equipment, verniers and may include laser alignment system and ultrasound systems (metal thickness)
Tests	• Tests to be conducted are to include material thickness, temperature variation, tracking alignment, and wear rate analysis
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to tracked mobile plant undercarriage and suspension systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Standards
- Vehicle industry regulations
- Vehicle industry publications related to emerging undercarriage and suspension system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work instructions and requirements and locate, interpret and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Comply with regulatory and commercial obligations
- Complete failure analyses on a minimum of three (3) undercarriage and suspension systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for plant undercarriage and suspension systems
- Accurately record and report analysis and evaluation processes, findings and outcomes
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Tracked mobile plant terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Electrical theory covering voltage, current, resistance, power and magnetics
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems

EVIDENCE GUIDE

Underpinning knowledge (continued)

- The functions of hydraulic pressure within undercarriage and suspension systems
- Detailed knowledge of the types, function, operations and limitations of mobile plant track systems/components
- Detailed knowledge of the types, function, operations and limitations of tracked mobile plant undercarriage systems/ components
- Detailed knowledge of the types, function, operations and limitations of tracked mobile plant suspension systems/ components
- General knowledge of mobile plant digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary track, undercarriage and suspension systems, monitoring and testing processes, diagnostic methods and options and safety procedures.

(Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, operational tracked mobile plant undercarriage and suspension systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5725A Analyse and evaluate wheeled mobile plant braking systems faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate wheeled mobile plant braking systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning wheeled mobile plant brake systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Wheeled mobile plant brake system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with technical specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Wheeled mobile plant covers all mobile plant other than those with tracked undercarriage. Included are loaders, dump trucks, graders, scrapers, industrial tractors, material handling machines, agricultural harvesters and other rural equipments
- Braking systems to be covered in this unit are to include foundation, ABS with traction control, air over hydraulic, hydraulic over hydraulic, air brakes, regenerative braking, full hydraulic, compression and transmission retarders
- Braking system failures covered by this unit are to include air supply capacity and response, application and release times, brake balance, brake drum wear, calibration/adjustment specifications, component damage, conductors – piping specifications, contamination, fluids out of specification, friction material abnormalities, leaks, overheating, system pressures
- Braking system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures

RANGE STATEMENT

Unit context (continued)	• Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include air gauges, computer-based diagnostic systems, micrometers, multi-meter, pressure gauges, temperature gauges, verniers and may include brake timer and electronic stethoscope
Tests	• Tests to be conducted are to include accumulator pressure, disk stack height, pressure, system performance (distance/balance), sensor/actuator and wiring harness integrity, sampling (collection and processing wear analysis (drum/disk/lining material) and monitoring/analysis of computer-based diagnostic systems
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to wheeled mobile plant braking systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle Industry Regulations
- Vehicle Industry Publications related to emerging braking system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) wheeled mobile plant braking systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for wheeled mobile plant braking systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Wheeled mobile plant terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Detailed knowledge of the types, functions, operations and limitations of wheeled mobile plant foundation braking systems/components
- Detailed knowledge of the types, functions and limitations of friction material associated with wheeled mobile plant braking systems
- Detailed knowledge of the types, function, operations and limitations of ABS traction control braking systems/ components
- Detailed knowledge of the types, function, operations and limitations of air over hydraulic braking systems/ components
- Detailed knowledge of the types, function, operations and limitations of hydraulic over hydraulic braking systems/ components
- Detailed knowledge of the types, function, operations and limitations of air braking systems/components
- Detailed knowledge of the types, function, operations and limitations of full hydraulic braking systems/components
- Detailed knowledge of the types, function, operations and limitations of compression braking systems components
- Detailed knowledge of the types, function, operations and limitations of mobile plant retarder systems/components
- Detailed knowledge of the influence of equipment trailing on mobile plant braking systems
- General knowledge of the Australian Design Rules requirements related to wheeled mobile plant braking systems
- General knowledge of the theory of diagnosis including concept, design and planning

EVIDENCE GUIDE

Underpinning knowledge (continued)

- General knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- Detailed knowledge of automotive digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary wheeled mobile plant brake systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, co-ordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using co-operative approaches to optimise workflow and productivity. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise re-working and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, wheeled mobile plant brake systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5726A Analyse and evaluate mobile plant hydraulic system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate mobile plant hydraulic systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning mobile plant hydraulic systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Mobile plant hydraulic system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Mobile plant covers all mobile plant both wheeled and tracked undercarriage. Included are loaders, dump trucks, graders, scrapers, industrial tractors, crawler tractors, excavator plant, material handling machines, agricultural harvesters and other rural equipment
- Hydraulic systems to be covered in this unit are to include all hydraulic systems of attachments and ground engaging equipment other than the transmission, steering, braking or suspension systems. Coverage is to include compensated systems, pressure and flow (PFC) and load sensing systems
- Failures covered by this unit are to include those to mechanical, hydraulic and electrical/electronic systems including control systems, emergency systems, vibration, calibration/adjustment specifications, contamination, component specifications, component assembly, component damage and system modifications

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements

RANGE STATEMENT

Unit context (continued)	• Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include stop watches, pressure gauges, flow meters, multi-meter, data readers, computerised diagnostic system
Tests	• Tests to be conducted are to include pressure, flow and temperature, cycle time performance, filter inspection, sequencing, sensor and actuator integrity, wiring harness integrity
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to mobile plant hydraulic systems • Australian Design Rules • Vehicle Industry Regulations • Vehicle Industry Publications related to emerging hydraulic system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) mobile plant hydraulic systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for mobile plant hydraulic systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Wheeled and tracked mobile plant terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of the types, function and limitations of wheeled and tracked mobile plant excavating and ground engaging systems/components
- General knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary mobile plant hydraulic systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, mobile plant hydraulic systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5730A Analyse and evaluate motorcycle steering, suspension and frame system faults

Unit descriptor

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

This unit covers the competency to correctly analyse and evaluate motorcycle steering, suspension and frame systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning motorcycle steering and suspension frame systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Motorcycle steering, suspension and frame system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Motorcycles are to include two-wheel, four-wheel and two-wheel fitted with sidecar
- Steering and suspension systems to be covered in this unit are to include steering, telescopic forks and leading and trailing link suspension
- Frames are to include tubular frame and alloy formed section
- Steering and suspension failures covered by this unit are to include alignment, control systems, emergency systems, frame out of specification, tyre wear, incorrect tyres, wheel balance, vibration, directional stability, calibration/adjustment specifications, loss of oil, contamination, lubrication out of specification, loss of gas pressure, component specifications, abnormal component wear, component assembly, component damage (forks, frame, swinging arm, bearings, faulty valves, damaged/faulty springs and system modifications
- Steering, suspension and frame system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluative criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

Testing equipment

- Testing equipment is to include callipers, dial indicator, flow meters, fork/oil and rear suspension gas filler kits, handle bar gauge, plumb line, pressure gauges, protractors, squares, static and dynamic wheel balancer, straight edges, string line, tape measures, theodolite, tyre pressure gauges, verniers and may include laser and light alignment equipment

Tests

- Tests to be conducted are to include tyre pressures, tyre tread, toe-in, toe-out, system pressures, frame alignment, ride height, wheel bearing specification

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material

RANGE STATEMENT

Information and procedures (continued)

- Manufacturer/component supplier specifications, schematics and operational procedures related to motorcycle steering, suspension and frame systems
- Australian Design Rules
- Vehicle Industry Regulations
- Vehicle Industry Publications related to emerging steering and suspension system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) motorcycle steering, suspension and frame systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for motorcycle steering, suspension and frame systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Motorcycle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Steering System theory including steering angles
- The functions of hydraulic pressure within steering and suspension systems
- Working knowledge of the types, applications and limitations of tyres used on motorcycles
- Detailed knowledge of the types, applications and limitations of material used in motorcycle frames
- Detailed knowledge of the types, function, operations and limitations of motorcycle steering systems/components
- Detailed knowledge of the types, function, operations and limitations of motorcycle suspension systems/components
- Detailed knowledge of the types and influences of leading and trailing link suspension on motorcycle performance
- General knowledge of automotive digital computing systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary motorcycle steering, suspension and frame systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, motorcycle steering, suspension and frame systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5731A Analyse and evaluate motorcycle engine and transmission system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate motorcycle engine transmission systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning motorcycle engine transmission systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Motorcycle engine transmission system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Motorcycles are to include two-wheel, four-wheel and two-wheel fitted with sidecar
- Motorcycle engine systems are to include two-stroke, four-stroke petrol single and multi-cylinder
- Total engine systems to be covered in this unit are to include the engine and related fuel, ignition, intake, exhaust, lubrication and cooling systems
- Motorcycle engine system failures covered by this unit are to include **engine** (poor performance, excessive oil consumption, engine stoppages), **fuel** (contamination, flow, pressure, leakage), **ignition** (no-start, no-run, misfire, erratic operation, lack of power, charging), **intake** (leakage, noise, vibration, inadequate control), **exhaust** (noise, pressure, abnormal, emissions, blockages), **lubrication** (pressure, flow, leakage, abnormal engine wear, inadequate filtration, sludge formation, excessive deposits, overheating), **cooling** (overcooling, insufficient cooler flow, coolant out of specification, lack of air flow, internal corrosion), **mounting** (noise, vibration, hardness, clutch shudder, erratic transmission control)
- Transmission systems to be covered by this unit are to include mechanical with variable ratio or constant mesh and chain drive, belt drive and gear drive

RANGE STATEMENT

Unit scope (continued)

- Transmission system failures covered by this unit are to include abnormal component wear, clutch operations, clutch pack slippage, chain or belt drive slippage, incorrect belt/chain adjustments, contamination, drive line phasing and alignment, hard shifting, leaks, loose mountings, lubrication, noises, operating temperature, rear wheel locking, vibrations
- Engine and transmission system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluative criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

Testing equipment

- Testing equipment is to include bore gauges, compression gauges, computer-based diagnostic system, cooling system analyser, crank case pressure tester (two-stroke), dial gauges, exhaust gas analysers, feeler gauges, micrometers, multi-meter, oscilloscope, pressure gauges, spring compression testers stethoscope, tachometer, telescopic gauges, temperature gauges, tension gauges, timing lights, torque gauges, vacuum gauges, verniers, and may include anemometer, barometer, hygrometer, specific gravity gauge and internet/satellite based diagnostics

RANGE STATEMENT

Tests	• Tests to be conducted are to include component wear analysis, compression, cylinder leakage, engine performance, exhaust gas sampling, flow, lubricant sampling, oil consumption, pressure, sample collection/processing, sensor integrity and function, specific gravity, temperature, transmission clutch slippage, vacuum, wiring harness integrity
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to motorcycle engine and transmission systems • Australian Design Rules • Motorcycle industry legislation/regulations • Motorcycle Industry Publications related to emerging engine and transmission system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence	• Interpret work order and locate and apply relevant information • Apply safety requirements including the isolation of equipment and the use of personal protective equipment

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) motorcycle engine transmission systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for motorcycle engine transmission systems

  Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Motorcycle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the types, functions, operations and limitations of motorcycle engines
- Detailed knowledge of the types, function, operations and limitations of motorcycle fuel systems/components
- Detailed knowledge of the types, function, operations and limitations of motorcycle ignition systems/components

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of the types, function, operations and limitations of motorcycle intake systems/components
- Detailed knowledge of the types, function, operations and limitations of motorcycle exhaust systems/components
- Detailed knowledge of the types, function, operations and limitations of motorcycle lubrication systems/components
- Detailed knowledge of the types, function, operations and limitations of motorcycle cooling systems/components
- Detailed knowledge of the types, function, operations and limitations of motorcycle engine and transmission mounting systems/components
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of automotive digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary motorcycle engine transmission systems, monitoring and testing processes, diagnostic methods and options and safety procedures.

(Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, motorcycle engine and transmission systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5732A Analyse and evaluate motorcycle electrical/electronic system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate motorcycle electrical/electronic systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning motorcycle electrical/electronic systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Motorcycle electrical/electronic system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with technical specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Motorcycles are to include two-wheel, four-wheel and two-wheel fitted with sidecar
- Electrical/electronic systems to be covered in this unit are to include lighting, ignition, charging, fuel injection, ABS, engine management and safety lock-out systems
- Electrical/electronic system failures covered by this unit are to include lighting (short circuit, grounded circuit, open circuit, faulty equipment, switches and relays), ignition (no-start, no-run, misfire, erratic operation, lack of power, charging, security lock out), fuel injection (contamination, loss of power, no-start, poor or erratic running, abnormal emissions), ABS (intermittent faults, operator feedback), engine management (poor performance, lack of power, erratic running, induction interference), safety lock-out systems (failure to crank, engine stops)
- Electrical/electronic system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures

RANGE STATEMENT

Unit context (continued)	• Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include ABS diagnostic tools, computer-based diagnostic systems, electronic vacuum gauge, engine control unit analyser, engine emission tester, fuel pressure and flow meter, headlight aiming testing equipment, injector tester, LED test lights, magnetic coil condenser tester, multi-meter, peak voltage meters, resister flow dynanometer, vacuum gauge
Tests	• Tests to be conducted are to include accumulator pressure, disk stack height, pressure, system performance (distance/balance), sensor/actuator and wiring harness integrity, sampling (collection and processing, wear analysis (drum/disk/lining materia) and monitoring/analysis of computer-based diagnostic systems
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to motorcycle electrical/electronic systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Motorcycle Industry Regulations
- Motorcycle Industry Publications related to emerging electrical/electronic system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) motorcycle electrical/electronic systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for motorcycle electrical/electronic systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Motorcycle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Detailed knowledge of the types, function, operations and limitations of motorcycle electrical/electronic systems/components
- General knowledge of the Australian Design Rules requirements related to motorcycle electrical/electronic systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of automotive digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary motorcycle electrical/electronic systems, monitoring and testing processes, diagnostic methods and options and safety procedures.

(Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, motorcycle electrical/electronic systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5733A Analyse and evaluate motorcycle braking system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate motorcycle braking systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning motorcycle braking systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Motorcycle braking system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Motorcycles are to include two-wheel, four-wheel and two-wheel fitted with sidecar
- Braking systems to be covered in this unit are to include mechanical, hydraulic and ABS systems
- Braking system failures covered by this unit are to include application and release times, brake balance, brake drum wear, calibration/adjustment specifications, component damage, conductors – piping specifications, contamination, fluids out of specification, friction material abnormalities, leaks, overheating, system pressures
- Braking system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

RANGE STATEMENT

Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include air gauges, computer-based diagnostic systems, dynanometer, micrometers, multi-meter, pressure gauges, temperature gauges, verniers and may include brake timer and electronic stethoscope
Tests	• Tests to be conducted are to include accumulator pressure, system performance (distance/balance), sensor/actuator and wear analysis (drum/disk/lining material) and monitoring/analysis of computer-based diagnostic systems
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to motorcycle braking systems • Australian Design Rules • Motorcycle Industry Regulations • Motorcycle Industry Publications related to emerging braking system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) motorcycle braking systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for motorcycle braking systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Motorcycle terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of the types, functions and limitations of friction material associated with motorcycle braking systems
- Detailed knowledge of the types, function, operations and limitations of motorcycle mechanical braking systems/ components
- Detailed knowledge of the types, function, operations and limitations of motorcycle hydraulic braking systems/ components
- Detailed knowledge of the types, function, operations and limitations of motorcycle ABS braking systems/ components
- Detailed knowledge of the influence of equipment trailing on motorcycle braking systems
- General knowledge of the Australian Design Rules requirements related to motorcycle braking systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of automotive digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary motorcycle braking systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, motorcycle braking systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5735A Analyse and evaluate light marine hydraulic system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate light marine hydraulic system in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning light marine hydraulic systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Light marine hydraulic system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Marine hydraulic systems to be covered in this unit are to include power assisted steering, hydraulic steering, bow thrusters, trim tabs, tilt and trim systems and winches

Unit context

- OH&S requirements include industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluative criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

Testing equipment

- Testing equipment is to include pressure gauges and may include valve pressure testing equipment

RANGE STATEMENT

Tests

- Tests to be conducted are to include stroke times for trim and tilt operation, leak down and creep, and full load water testing

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to light marine hydraulic systems
- Marine Industry Regulations
- Marine industry Publications related to emerging marine hydraulic system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Complete failure analyses on a minimum of three (3) light marine hydraulic systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for light marine hydraulic systems
- Accurately record and report the diagnostic process and findings and recommended rectification for the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Basic hydraulic theory covering pressure, flow and force.
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Mechanical theory covering the concepts and principles of mechanical systems and levers
- Detailed knowledge of the types, characteristics, functions and limitations of hydraulic steering
- Detailed knowledge of the types, characteristics, functions and limitations of power steering for inboard and outboard systems
- Detailed knowledge of the types, characteristics, functions and limitations of power trim and tilt systems for outboard and stern drive units
- General knowledge of boat drive and steering forces
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary light marine hydraulic systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, light marine hydraulic systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5736A Analyse and evaluate light marine transmission system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate light marine transmission systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning light marine transmission systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Light marine transmission system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Light marine transmission systems to be covered in this unit are to include stern drive, inboard shaft and 'V' drive, outboard, counter rotating outboard propellers, jet drive
- Failure analysis is to include component failure, cooling, hydraulic pressures, driveline vibration, driveline sealing, shift control, propeller selection and failure

Unit context

- OH&S requirements include industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluative criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

RANGE STATEMENT

Testing equipment	• Testing equipment is to include dial indicator, gearbox pressure and vacuum tester, multimeter, computerised diagnostic system, cover nut tool, drive shaft spline tool, slide hammer, pinion height gauge, pressure gauge, temperature gauge, torque wrench and shaft alignment tool
Tests	• Tests to be conducted are to include shaft run out, pinion depth, gear backlash, component wear analysis, pressure and vacuum tests, tooth contact markings, propeller shaft end float, engine alignment, shift adjustment, shift interrupt adjustment
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to light marine transmission system • Marine industry regulations • Marine industry publications related to emerging light marine transmission system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence	• Interpret work order and locate and apply relevant information • Apply safety requirements including the isolation of equipment and the use of personal protective equipment

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) light marine transmission systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for light marine transmission systems
- Accurately record and report the diagnostic process and findings and recommended rectification for the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Light marine transmission terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Mechanical theory covering the concepts and principles of bearings, gears and shafts
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Detailed knowledge of the function, operation, settings and adjustment of stern drives, inboard shaft and ‘V’ drives, outboards, jet drives, cooling systems, drivelines, shift controls and propellers.
- Detailed knowledge of engine and shaft alignment for inboard and stern drive installations
- Detailed knowledge of propeller theory
- General knowledge of marine digital computing systems

EVIDENCE GUIDE

Underpinning knowledge (continued)

- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary light marine transmission systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, light marine transmission systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5737A Analyse and evaluate light marine engine and powerhead system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate light marine engine powerhead systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning light marine engine powerhead systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Light marine engine powerhead system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Engine systems are to include two-stroke, four-stroke, diesel and petrol engines
- Engine systems to be covered in this unit are to include the engine and related fuel, ignition, intake, exhaust, lubrication and cooling systems
- Coverage is to include direct high pressure petrol injection two stroke
- Engine system failures covered by this unit are to include **engine** (poor performance, excessive oil consumption, engine stoppages), **fuel** (contamination, flow, pressure, leakage), **ignition** (pre ignition, detonation, no-start, no-run, misfire, erratic operation, lack of power, charging), **intake** (leakage, noise, vibration, inadequate control), **exhaust** (pressure, abnormal emissions against current and proposed standards), **lubrication** (pressure, flow, leakage), abnormal engine wear, inadequate filtration, sludge formation, excessive deposits, overheating), **cooling** (overcooling, coolant out of specification, lack of water flow, internal corrosion), **mounting** (noise, vibration, harshness), **engine management**, engine performance (response, fuel consumption), contamination, emissions, forced induction, fuel supply/pressure, leaks, sensors, starting and damaged components
- Engine system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include bore gauges, compression gauges, computer-based diagnostic system (direct and internet), cooling system analyser, dial gauges, micrometers, multi-meter, oscilloscope, pressure gauges, stethoscope, telescopic gauges, temperature gauges, tachometer, timing lights, vacuum gauges, verniers, and may include anemometer, barometer, specific gravity gauge
Tests	• Tests to be conducted are to include component wear analysis, compression, cylinder leakage, engine performance, oil consumption, pressure, sample collection/processing, specific gravity, temperature, vacuum, ignition timing adjustments, injector pump timing
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material

RANGE STATEMENT

Information and procedures (continued)

- Manufacturer/component supplier specifications, schematics and operational procedures related to light marine engine systems
- Marine industry regulations
- Marine industry publications related to emerging engine system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) light marine engine powerhead systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for light marine engine powerhead systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Light marine terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic electrical theory covering voltage, current, resistance, power, magnetics and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the types, functions, operations and limitations of light marine engines
- Detailed knowledge of the types, function, operations and limitations of light marine fuel systems/components
- Detailed knowledge of the types, function, operations and limitations of light marine ignition systems/components
- Detailed knowledge of the types, function, operations and limitations of light marine intake systems/components
- Detailed knowledge of the types, function, operations and limitations of light marine exhaust systems/components
- Detailed knowledge of the types, function, operations and limitations of light marine lubrication systems/components
- Detailed knowledge of the types, function, operations and limitations of light marine cooling systems/components
- Detailed knowledge of the types, function, operations and limitations of light marine engine mounting systems/components
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of marine digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary light marine engine powerhead systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, light marine engine powerhead systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5738A Analyse and evaluate light marine hull performance and stability system faults

Unit descriptor

This unit covers the competency to correctly analyse and evaluate light marine hull performance systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning light marine hull performance systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Light marine hull performance system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstances, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Total systems to be covered in this unit are to include the boat and engine combination as well as boat trimming systems, boat loading and all fitted accessories
- Boats are to include inboard and outboard propelled vessels, including twin engine installations, which are fifty horsepower or above. They can be either two stroke, four stroke or diesel
- Failures covered by this unit are to include engine (poor performance, poor selection, incorrect fitting, overloading, overpowering), propeller selection (size, pitch, material and application), hull faults and stress (transom rot, delamination, hook, rocker, power hook, surface finish and design), mounting (noise, vibration, hardness)
- Boat performance and control faults covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operation

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements

RANGE STATEMENT

Unit context (continued)	• Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include compression gauges, computer-based diagnostic system, straight edges, engineer protractor or inclinometer, tape measure, tachometer, feeler gauges, analogue and digital multi-meter, pressure gauges, stethoscope, temperature gauges, timing lights, torque gauges, verniers, hand and power tools, engine alignment bar, transom compass and drilling jig
Tests	• Tests to be conducted are to include engine performance and maximum speed, propeller matching, hull performance and stability water tests, water flow and temperature, hull integrity, fuel and oil consumption
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to marine installation guidelines • Marine industry legislation/regulations • Marine industry publications related to emerging engine/hull system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) light marine hull performance systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for light marine hull performance systems
- Accurately record and report the diagnostic process and findings and recommended rectification for two of the above
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Light marine terminology and definitions
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Detailed knowledge of the types, function, operations and characteristics of marine two stroke, four stroke and diesel engines

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of marine engine installation and rigging techniques
- Detailed knowledge of propeller selection techniques and procedures
- Detailed knowledge of boat trimming methods and planing aspects
- Detailed knowledge of marine hull performance and design characteristics
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions and operations of diagnostic testing equipment
- General knowledge of marine engine digital computing systems
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary light marine hull performance systems, monitoring and testing processes, diagnostic methods and options and safety procedures.
	(Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs.
	(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, operational light marine hull performance systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority

EVIDENCE GUIDE

Method of assessment (continued)	• Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5740A Develop and apply mechanical systems modification

Unit descriptor

This unit covers the competency to develop, apply and validate significant modification to existing mechanical systems in order to vary or enhance performance. This includes the preparation and application of specifications and processes which comply with any safety, legal and commercial obligations.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the modification requirement	1.1 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.2 The purpose and objectives of the modification are identified from an analysis of inputs and confirmed as necessary with the customer
	1.3 Outline options for achieving the required purpose and objectives are identified, framed and presented to the customer prior to proceeding
	1.4 Possible legal and safety impacts of the modification are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Develop and validate the modification specification	2.1 Benchmark specifications for the existing mechanical system are accessed and interpreted
	2.2 Criteria to be used in the selection of the modification method and in the evaluation of the outcomes are identified and documented
	2.3 The proposed modification method is selected following the identification, consideration and evaluation of the full range of available and relevant options
	2.4 The selected option, including material choices and processes, is developed in detail and progressively validated against the established criteria
	2.5 The modification specification is documented to industry and enterprise standards

ELEMENT	PERFORMANCE CRITERIA
3. Apply and test the modification specification	3.1 The selected modification method and process is followed in accordance with the established specifications
	3.2 The modification is completed using equipment, tools and material in accordance with accepted industry standards and practices
	3.3 Tests and testing equipment are applied in accordance with regulatory requirements, the manufacturer/ component supplier specifications and the modification specification
	3.4 Test results and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes
	3.5 Variations necessitated during the modification process or as a result of testing are incorporated into the modification specification
	3.6 Information and detail related to the modification is documented and provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	4.3 Waste and scrap is removed following workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	4.5 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Mechanical modifications to be covered by this unit are to cover significant and non-routine mechanical modifications which may include:
  - adapt or modify the mechanical system(s) of vehicles/plant to a significantly changed capability
  - adapt vehicles/plant mechanical systems for different working conditions, for example high altitude or underground mine
  - modify or install a significant mechanical system(s) for a special purpose vehicle in preparation for vehicle registration
- Inputs to the modification method and processes may be obtained from customer requirements, manufacturer/ component supplier specifications, outcomes of diagnostic processes or from regulatory, licensing, intellectual property legislation, safety requirements and Australian Design Rules

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluation criteria

- Evaluation criteria, sometimes referred to as success factors, are established prior to a modification being undertaken and are to cover safety, functionality, survivability, maintainability life cycle cost and aesthetics

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

Tests and testing equipment

- Tests and testing equipment is to include that appropriate to the modification being carried out but it should include relevant computer-based diagnostic systems

RANGE STATEMENT

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to mechanical systems modification
- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging mechanical systems technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Correctly modify a significant mechanical system or sub-system including:
- The selection, development and recording of success factors and evaluation criteria before undertaking the modification
- The selection, development and validation of the modification methodology, process(es) and specification
- The application of the modification specification (methodology and process) and the recording and reporting of the outcomes
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Detailed knowledge of the types, functions, operations and limitations of the main automotive industry mechanical systems
- General knowledge of automotive digital computing systems
- Detailed knowledge of the types, functions, operations and limitations of relevant diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting modification specifications and outcomes

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Collect, organise and understand legal and technical information related to contemporary mechanical systems modifications. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the development and planning of modification processes, the preparation and layout of the worksite and the obtaining of tools, equipment, material and testing equipment to avoid any back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate specifications, calibrate and establish testing equipment and evaluate modification results against pre-established criteria. (Level 2)
Solve problems	Establish modification methods and processes which anticipate and allow for risks and avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology	Use the full range of workplace technology related to mechanical systems modification including testing equipment, maintenance equipment, tools, calculators and measuring devices and information management systems.

(Level 2)

EVIDENCE GUIDE

Resource implications	• Access to operational mechanical system(s), information on the required or proposed modification, testing equipment for the work and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other projects
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material and deadlines

AURT5741A Develop and apply hydraulic systems modification

Unit descriptor

This unit covers the competency to develop, apply and validate significant modifications to existing hydraulic systems in order to vary or enhance performance. This includes the preparation and application of specifications and processes which comply with any safety, legal and commercial obligations.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the modification requirement	1.1 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.2 The purpose and objectives of the modification are identified from an analysis of inputs and confirmed as necessary with the customer
	1.3 Outline options for achieving the required purpose and objectives are identified, framed and presented to the customer prior to proceeding
	1.4 Possible legal and safety impacts of the modifications are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Develop and validate the modification specification	2.1 Benchmark specifications for the existing hydraulic system are accessed and interpreted
	2.2 Criteria to be used in the selection of the modification method and in the evaluation of the outcomes are identified and documented
	2.3 The proposed modification method is selected following the identification, consideration and evaluation of the full range of available and relevant options
	2.4 The selected option, including material choices and processes, is developed in detail and progressively validated against the established criteria
	2.5 The modification specification is documented to industry and enterprise standards
3. Apply and test the modification specification	3.1 The selected modification method and process is followed in accordance with the established specifications
	3.2 The modification is completed using equipment, tools and material in accordance with accepted industry standards and practices

ELEMENT	PERFORMANCE CRITERIA
3. Apply and test the modification specification (continued)	3.3 Tests and testing equipment are applied in accordance with regulatory requirements, the manufacturer/ component supplier specifications and the modification specification
	3.4 Test results and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes
	3.5 Variations necessitated during the modification process or as a result of testing are incorporated into the modification specification
	3.6 Information and detail related to the modification is documented and provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	4.3 Waste and scrap is removed following workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	4.5 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Hydraulic modifications to be covered by this unit are significant and non-routine hydraulic modifications, which may include:
  - adapt or modify the hydraulic systems of vehicles/plant to a significantly changed capability
  - adapt vehicles/plant hydraulic systems for different working conditions, for example high altitude or underground mine

RANGE STATEMENT

Unit scope (continued)

- modify or install a significant hydraulic system(s) for a special purpose vehicle in preparation for vehicle registration
- Inputs to the modification method and processes may be obtained from customer requirements, manufacturer/ component supplier specifications, outcomes of diagnostic processes or from regulatory, licensing, intellectual property legislation, safety requirements and Australian Design Rules

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, MATERIAL, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluation criteria

- Evaluation criteria, sometimes referred to as success factors, are established prior to a modification being undertaken and are to cover safety, functionality, survivability, maintainability life cycle cost and aesthetics

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

Tests and testing equipment

- Tests and testing equipment is to include that appropriate to the modification being carried out but it should include relevant computer-based diagnostic systems

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to hydraulic systems modification

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle Industry Regulations
- Vehicle Industry Publications related to emerging hydraulic systems technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Correctly modify a significant hydraulic system or sub-system including
    - The selection, development and recording of success factors and evaluation criteria before undertaking the modification
    - The selection, development and validation of the modification methodology, process(es) and specification
    - The application of the modification specification (methodology and process), and
    - The recording and reporting of the outcomes
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Hydraulic theory covering the concepts and principles of hydraulic and pneumatic systems
- Detailed knowledge of the types, functions, operations and limitations of the main automotive industry hydraulic systems
- General knowledge of automotive digital computing systems
- Detailed knowledge of the types, functions, operations and limitations of relevant diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting modification specifications and outcomes

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Collect, organise and understand legal and technical information related to contemporary hydraulic systems modifications. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the development and planning of modification processes, the preparation and layout of the worksite and the obtaining of tools, equipment, material and testing equipment to avoid any back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate specifications, calibrate and establish testing equipment and evaluate modification results against pre-established criteria. (Level 2)
Solve problems	Establish modification methods and processes which anticipate and allow for risks and avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the full range of workplace technology related to hydraulic systems modification including testing equipment, maintenance equipment, tools, calculators and measuring devices and information management systems. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to operational hydraulic system(s), information on the required or proposed modification, testing equipment for the work and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other projects

EVIDENCE GUIDE

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material and deadlines

AURT5742A Develop and apply pneumatic systems modification

Unit descriptor

This unit covers the competency to develop, apply and validate significant modifications to existing pneumatic systems in order to vary or enhance performance. This includes the preparation and application of specifications and processes which comply with any safety, legal and commercial obligations.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the modification requirement	1.1 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.2 The purpose and objectives of the modification are identified from an analysis of inputs and confirmed as necessary with the customer
	1.3 Outline options for achieving the required purpose and objectives are identified, framed and presented to the customer prior to proceeding
	1.4 Possible legal and safety impacts of the modification are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Develop and validate the modification specification	2.1 Benchmark specifications for the existing pneumatic system are accessed and interpreted
	2.2 Criteria to be used in the selection of the modification method and in the evaluation of the outcomes are identified and documented
	2.3 The proposed modification method is selected following the identification, consideration and evaluation of the full range of available and relevant options
	2.4 The selected option, including material choices and processes, is developed in detail and progressively validated against the established criteria
	2.5 The modification specification is documented to industry and enterprise standards
3. Apply and test the modification specification	3.1 The selected modification method and process is followed in accordance with the established specifications
	3.2 The modification is completed using equipment, tools and material in accordance with accepted industry standards and practices

ELEMENT	PERFORMANCE CRITERIA
3. Apply and test the modification specification (continued)	3.3 Tests and testing equipment are applied in accordance with regulatory requirements, the manufacturer/ component supplier specifications and the modification specification
	3.4 Test results and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes
	3.5 Variations necessitated during the modification process or as a result of testing are incorporated into the modification specification
	3.6 Information and detail related to the modification is documented and provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	4.3 Waste and scrap is removed following workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	4.5 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Pneumatic modifications to be covered by this unit are significant and non-routine pneumatic modifications which may include:
  - adapt or modify the pneumatic systems of vehicles/plant to a significantly changed capability
  - modify or install a significant pneumatic system(s) for a special purpose vehicle in preparation for vehicle registration

RANGE STATEMENT

Unit scope (continued)	• Inputs to the modification method and processes may be obtained from customer requirements, manufacturer/ component supplier specifications, outcomes of diagnostic processes or from regulatory, licensing, intellectual property legislation, safety requirements and Australian Design Rules
Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluation criteria	• Evaluation criteria, sometimes referred to as success factors, are established prior to a modification being undertaken and are to cover safety, functionality, survivability, maintainability life cycle cost and aesthetics
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Tests and testing equipment	• Tests and testing equipment is to include that appropriate to the modification being carried out but it should include relevant computer-based diagnostic systems
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to pneumatic systems modification

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging pneumatic systems technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Correctly modify a significant pneumatic system or sub-system including:
    - the selection, development and recording of success factors and evaluation criteria before undertaking the modification
    - the selection, development and validation of the modification methodology, process(es) and specification
    - the application of the modification specification (methodology and process), and
    - the recording and reporting of the outcomes
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Pneumatic theory covering the concepts and principles of hydraulic and pneumatic systems
- Detailed knowledge of the types, functions, operations and limitations of the main automotive industry pneumatic systems
- General knowledge of automotive digital computing systems
- Detailed knowledge of the types, functions, operations and limitations of relevant diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting modification specifications and outcomes

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Collect, organise and understand legal and technical information related to contemporary pneumatic systems modifications. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the development and planning of modification processes, the preparation and layout of the worksite and the obtaining of tools, equipment, material and testing equipment to avoid any back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate specifications, calibrate and establish testing equipment and evaluate modification results against pre-established criteria. (Level 2)
Solve problems	Establish modification methods and processes which anticipate and allow for risks and avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the full range of workplace technology related to pneumatic systems modification including testing equipment, maintenance equipment, tools, calculators and measuring devices and information management systems. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to operational pneumatic system(s), information on the required or proposed modification, testing equipment for the work and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other projects

EVIDENCE GUIDE

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material and deadlines

AURT5750A Analyse and evaluate electrical and electronic faults in stability/steering/ suspension systems

Unit Descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic stability/steering/suspension systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning electrical and electronic stability/steering/suspension systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options
	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Electrical and electronic stability/steering/suspension system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit Scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Systems are to include traction, stability, steering, suspension systems across the range of vehicle types. Coverage is to include electronic stability systems, vehicle dynamic control, closed loop electronic steering and multi-class Bus systems
- Electrical and electronic failures in stability/steering and suspension system covered by this unit are to include direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Stability/steering and suspension system failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit Context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative Criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation Procedures	• Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all Supplementary Restraint Systems (SRS) by manufacturer/ component supplier specifications
Testing equipment	• Testing equipment is to include analogue and digital multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, pulse generators and may include other manufacturer/component supplier testing equipment
Tests	• Tests to be conducted are to include wiring and connector integrity, operator and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and intermittent causes
Personal Protective Equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and Procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to stability/steering and suspension systems

RANGE STATEMENT

Information and Procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging stability/ steering/suspension system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical Aspects of Evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) stability, steering and suspension systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for stability, steering and suspension systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning Knowledge

- Basic mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the types, functions and operations of stability/steering and suspension systems
- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of the concepts, types, functions, operations and limitations of electro mechanical and electro-fluid sub-systems within light vehicle, mobile plant, and/or light marine engine management systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

EVIDENCE GUIDE

Underpinning Skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary electrical and electronic stability/steering/suspension systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)

EVIDENCE GUIDE

Underpinning Skills (continued)

Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource Implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, electrical and electronic stability/steering/suspension systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of Assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of Assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5751A Analyse and evaluate electrical and electronic faults in electric over hydraulic systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electric over hydraulic systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning electric over hydraulic systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options
	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Electric over hydraulic system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Electric over hydraulic systems are characterised as those using solenoids to control hydraulic flow and they may include integrated computer controlled systems. Examples are garbage compactors, crane rams, steering control, excavator bucket control, steering rudder control.
- Electric over hydraulic system electrical and electronic failures covered by this unit are to include faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Electric over hydraulic system failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards and are to include where appropriate the disarming of all Supplementary Restraint Systems (SRS) required by manufacturer/component supplier specifications
Testing equipment	• Testing equipment is to include analogue and digital multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, pulse generators and may include other manufacturer/component supplier testing equipment
Tests	• Tests to be conducted are to include wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to electric over hydraulic systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging electric over hydraulic system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) electric over hydraulic systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for electric over hydraulic systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Basic mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the types, functions and operations of electric over hydraulic systems
- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of concepts, types, functions, operations and limitations of electro mechanical and electro-fluid sub-systems within light vehicle, mobile plant, heavy vehicle, light marine electric over hydraulic systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families and radio frequency
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operations

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary electric over hydraulic systems, monitoring and testing processes, diagnostic methods and options and safety procedures.

(Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, electric over hydraulic systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

EVIDENCE GUIDE

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5752A Analyse and evaluate electrical and electronic faults in engine management systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in engine management systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning engine management systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Engine management system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Engine management systems are characterised as those which use a digital computer to manage fuel, ignition, engine speed, performance and engine emissions and also any other optional equipment systems
- Coverage is to include fuel cell technology/hydrogen, on line maintenance and remote diagnostics, common rail diesel direct injection, drive by wire, multi-class Bus systems and closed loop diesel engine management systems
- Engine management systems electrical and electronic failures covered by this unit are to include direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Engine management system failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures

RANGE STATEMENT

Unit context (continued)	• Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all Supplementary Restraint Systems (SRS) required by manufacturer/component supplier specifications
Testing equipment	• Testing equipment is to include 4 gas exhaust gas analyser, compression gauge, feeler gauge, engine tune oscilloscope, analogue and digital multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, pulse generators, noid lamps, fuel pressure gauges, vacuum gauge and may include dynamometer and manufacturer/component supplier testing equipment
Tests	• Tests to be conducted are to include engine compression, valve adjustment and timing, exhaust gas analysis, fuel flow, fuel pressure, wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to engine management systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging engine management system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) engine management systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for engine management systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Basic mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the types, functions and operations of diesel, petrol, LPG and NG engine system operation
- General knowledge of the types, functions and operations of engine management systems
- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of the concepts, types, functions, operations and limitations of electro mechanical and electro-fluid sub-systems within light vehicle, mobile plant, and/or light marine engine management systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, engine management systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5753A Analyse and evaluate electrical and electronic faults in transmission/driveline systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in transmission/ driveline systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning electrical and electronic transmission/driveline systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options
	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Electrical and electronic transmission/driveline system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Transmission/driveline systems to be covered by this unit include clutches, torque converters, mechanical and automatic transmissions, drive and power take-off shafts and differentials. Coverage is to include mechatronic modules and multi-class Bus systems
- Transmission/driveline systems electrical and electronic failures covered by this unit are to include direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Transmission/driveline systems failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures.
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all Supplementary Restraint Systems (SRS) required by manufacturer/component supplier specifications
Testing equipment	• Testing equipment is to include multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, and may include pulse generators and manufacturer/ component supplier testing equipment
Tests	• Tests to be conducted are to include wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation an d readings related to direct, indirect and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to transmission/driveline systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging transmission/driveline system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) transmission/driveline systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for transmission/driveline systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Basic mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the types, functions and operations of transmission/driveline systems
- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of the concepts, types, functions, operations and limitations of electro mechanical and electro-fluid sub-systems within light vehicle, mobile plant, heavy vehicle, transmission/driveline systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary electrical and electronic transmission/driveline systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, operational electrical and electronic transmission/driveline systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5754A Analyse and evaluate electrical and electronic faults in braking systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in braking systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning electrical and electronic braking systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Electrical and electronic braking system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Braking systems to be covered here are to include ABS, engine brakes, electric retarders, electric trailer brakes, brake by wire and multi-class Bus systems
- Braking systems electrical and electronic failures covered by this unit are to include direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Braking systems failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

RANGE STATEMENT

Evaluative criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all Supplementary Restraint Systems (SRS) required by manufacturer/component supplier specifications

Testing equipment

- Testing equipment is to include analogue and digital multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, and may include pulse generators and manufacturer/component supplier testing equipment

Tests

- Tests to be conducted are to include wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and intermittent causes

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to braking systems
- Australian Design Rules
- Vehicle Industry Regulations
- Vehicle Industry Publications related to braking system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) braking systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for braking systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Basic mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the types, functions and operations of braking systems
- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of the concepts, types, functions, operations and limitations of electronic braking systems

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of electrical theory and operation covering automotive digital computers, voltage, current, resistance, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families as related to electronic braking systems
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary electrical and electronic braking systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, operational electrical and electronic braking systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5755A Analyse and evaluate electrical and electronic faults in safety systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in safety systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning safety systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Safety system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Safety systems in this unit are to include fire suppressing, work load detecting, tyre pressure control, speed/load limiting, traction control, seat belt pre-tensioning, roll over protection, object detection, navigation aids, intelligent transport systems, intelligent SRS systems, adaptive cruise control, multi-class Bus systems, active and passive collision avoidance, infrared vision, lighting, windscreen wipers control, depth sounders, emergency distress systems, CB and Marine radio
- Safety systems electrical and electronic failures covered by this unit are to include direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Safety systems failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements

RANGE STATEMENT

Unit context (continued)	• Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all Supplementary Restraint Systems (SRS) required by manufacturer/component supplier specifications
Testing equipment	• Testing equipment may include analogue and digital multi-meters, data scanners, test lights, test LED's, lab oscilloscopes, acoustic analysers, and manufacturer/ component supplier testing equipment
Tests	• Tests to be conducted are to include wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to automotive safety systems • Australian Design Rules • Vehicle Industry Regulations • Vehicle Industry Publications related to automotive safety system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) electronic safety systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for electronic safety systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Basic mechanical theory covering the concepts and principles of mechanical, and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the types, functions and operations of safety systems
- General knowledge of sound acoustics, human hearing system, radio waves, amplitude modulation, frequency modulation, wavelength, stereo and signal processing, SWR

EVIDENCE GUIDE

Underpinning knowledge (continued)

- General knowledge of the concepts, types, functions, operations and limitations of electro mechanical and electronic sub-systems within light vehicle, mobile plant, heavy vehicle, light marine safety systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary safety systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, operational safety systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority

EVIDENCE GUIDE

Method of assessment (continued)	• Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5756A Analyse and evaluate electrical and electronic faults in monitoring/protection systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in monitoring/protection systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning monitoring/protection systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options
	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Monitoring/protection system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Systems monitored are to include engine, transmission/ driveline, body, auxiliary systems, safety critical systems and shutdown
- Monitoring/protection systems are to cover display types including LCD, VFD, CRT, HUD, re-configurable systems, electronic analogue display, on board diagnostics, remote/wireless monitoring systems and multi-class Bus systems
- Monitoring/protection systems electrical and electronic failures covered by this unit are to include direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Monitoring/protection systems failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all supplementary restraint systems (SRS) required by manufacturer/component supplier specifications
Testing equipment	• Testing equipment is to include analogue and digital multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, and may include manufacturer/component supplier testing equipment and pulse generators
Tests	• Tests to be conducted are to include wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to automotive monitoring/protection systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to automotive monitoring/protection system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) automotive monitoring/protection systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for automotive monitoring/protection systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Basic mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of the types, functions and operations of monitoring/protection systems
- General knowledge of the concepts, types, functions, operations and limitations of electro mechanical and electro-fluid sub-systems within light vehicle, mobile plant, heavy vehicle, light marine monitoring/protection systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary monitoring/protection systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, operational monitoring/protection systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5758A Analyse and evaluate electrical and electronic faults in convenience and entertainment systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in convenience and entertainment systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning convenience and entertainment systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options
	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.5 Convenience and entertainment system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documentation
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documentation to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documentation and reported in accordance with regulatory and enterprise requirements and practices

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures
	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Convenience and entertainment systems in this unit are to include telematic controls and multi-media or wheels, vehicle acoustics, tilt/trim, winch, voltage reducers, voltage inverters, central locking, power windows, sun roof, seat positioning, mirror positioning, steering wheel positioning, seatbelt positioning and multi-class Bus systems
- Entertainment systems in this unit are to include audio and visual units, compact disks, analogue tapes, radio, speaker types, amplifiers, crossovers, balancers, aerials and multi-class Bus systems
- Convenience and entertainment systems failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all supplementary restraint systems (SRS) required by manufacturer/component supplier specifications
Testing equipment	• Testing equipment is to include analogue and digital multi-meters, data scanners, test lights, test LEDs, lab oscilloscopes, acoustic analysers, and manufacturer/ component supplier testing equipment
Tests	• Tests to be conducted are to include wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, sound quality, SWR, winch, voltage reducers, voltage inverters, data interpretation and readings related to direct, indirect and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material

RANGE STATEMENT

Information and procedures (continued)

- Manufacturer/component supplier specifications, schematics and operational procedures related to automotive convenience and entertainment systems
- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to convenience and entertainment system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) convenience and entertainment systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for convenience and entertainment systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- Basic mechanical theory covering the concepts and principles of mechanical, and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of the types, functions and operations of convenience and entertainment systems
- General knowledge of the concepts, types, functions, operations and limitations of electro mechanical and electronic sub-systems within convenience and entertainment systems
- General knowledge of sound acoustics, human hearing system, radio waves, amplitude modulation, frequency modulation, wavelength, stereo and signal processing, SWR
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, radio frequency, discrete electronic components, logic families, DC motors, solenoids
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary convenience and entertainment systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices.

(Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a realistic requirement and objective(s) for analysis and evaluation, operational convenience and entertainment systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5759A Analyse and evaluate electrical and electronic faults in theft deterrent systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in theft deterrent systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning theft deterrent systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Theft deterrent system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Theft deterrent systems are to include remote keyless entry (RKE), immobiliser system design, passive entry systems, two way RKE, fingerprint technologies, rolling codes, transmitter and receiver operation, satellite systems
- Theft deterrent systems electrical and electronic failures covered by this unit are to include direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Theft deterrent systems failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

RANGE STATEMENT

Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Testing equipment	• Testing equipment is to include analogue and digital multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, and may include manufacturer/component supplier testing equipment
Tests	• Tests to be conducted are to include wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to theft deterrent systems • Australian Design Rules • Vehicle industry regulations • Vehicle industry publications related to theft deterrent system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self an others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) theft deterrent systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for theft deterrent systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- General knowledge of the concepts, types, functions, operations and limitations theft deterrent systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary theft deterrent systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, operational theft deterrent systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5760A Analyse and evaluate electrical and electronic faults in electric and hybrid vehicle systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in hybrid vehicle systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning hybrid vehicle systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements
	2.5 Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.6 Hybrid vehicle system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Electric and hybrid vehicle systems are to include petrol/electric hybrid vehicles, series and parallel drive vehicles, industrial floor cleaners, fork lifts and golf buggies
- Coverage is to include battery technology, motor drive systems, motor controllers, air conditioning systems, electronic protection systems and multi-class Bus systems
- Electric and hybrid vehicle systems electrical and electronic failures covered by this unit are to include direct faults in input sensors, output actuators including inverters, high voltage AC and DC motors, high voltage generators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Electric and hybrid vehicle systems failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures

RANGE STATEMENT

Unit context (continued)	• Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluative criteria	• Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all supplementary restraint systems (SRS) required by manufacturer/component supplier specifications
Testing equipment	• Testing equipment is to include multi-meters, lab oscilloscopes, data scanners, test lights, battery testers, and test LEDs, and may include manufacturer/component supplier testing equipment
Tests	• Tests to be conducted are to include batteries, drive motor, generator, inverter, chargers, motor controller, emissions, wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and intermittent causes
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to electric and hybrid vehicle systems

RANGE STATEMENT

Information and procedures (continued)

- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to electric and hybrid vehicle system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) hybrid vehicle systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for hybrid vehicle systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation

EVIDENCE GUIDE

Underpinning knowledge (continued)

- General knowledge of the types, functions and operations of systems
- General knowledge of the theory of diagnosis including concept, design and planning
- General knowledge of the concepts, types, functions, operations and limitations of electric and hybrid vehicle systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, high voltage safety requirements, high voltage battery technology, high voltage inverter, high voltage permanent magnet DC motors, high voltage wire wound field magnet motors, high voltage single and three phase AC motors, high voltage permanent magnet three phase AC motors, DC stepper motors, series hybrid drive, parallel hybrid drive, discrete electronic components, logic families, and radio frequency
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary hybrid vehicle systems, monitoring and testing processes, diagnostic methods and options and safety procedures.

(Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, operational hybrid vehicle systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5761A Analyse and evaluate electrical and electronic faults in climate control systems

Unit descriptor

This unit covers the competency to correctly analyse and evaluate electrical and electronic faults in climate control systems in order to initiate action to sustain, vary or enhance performance. It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. It also requires the candidate to identify, evaluate, select and record the most appropriate response to the stated objective of the analysis and evaluation process.

This unit forms part of the competency inventory for an automotive technologist or subject matter specialist. It encompasses and builds on trade level competencies.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements
	1.2 Benchmark specifications for correctly functioning climate control systems are accessed and interpreted
	1.3 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.4 The effects of any systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence
	1.5 Possible safety impacts of the work are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work
	2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems
	2.3 The most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for analysis and evaluation (continued)	2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and enterprise requirements Tools and material required to support the diagnostic process are identified, selected and prepared for use
	2.5 Climate control system components are prepared for the diagnostic process including park-up, isolation and cleaning requirements
3. Apply the analysis and evaluative methodology	3.1 The selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorised method
	3.2 Tests and testing equipment are applied in accordance with regulatory requirements and the manufacturer/ component supplier specifications
	3.3 Analytical and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes, and documented
	3.4 Analytical findings and results are evaluated against the agreed criteria
	3.5 Valid conclusions are drawn from the available evidence and documented to enterprise requirements
	3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information
	4.2 The most appropriate response option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and commercial policies
	4.3 The selected response option is documented and reported in accordance with regulatory and enterprise requirements and practices
5. Restore the workplace	5.1 Material that can be reused is collected and stored
	5.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	5.3 Waste and scrap is removed following workplace procedures

ELEMENT	PERFORMANCE CRITERIA
5. Restore the workplace (continued)	5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
	5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance
- Climate control systems are systems controlled by digital computer to maintain the in-cabin temperature to that selected by the operator, independent of the influence of external climatics. It includes air conditioning, heating, blending systems and multi-class Bus systems
- Climate control systems electrical and electronic failures covered by this unit are to include direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, component damage and system modifications
- Climate control systems failures covered by this unit are to include indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

RANGE STATEMENT

Evaluative criteria

- Evaluative criteria, sometimes referred to as success factors, detail the criteria against which the achievement of the objectives of the analysis are judged. They are to include statistically based criteria and may include other measures

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards and are to include the disarming of all Supplementary Restraint Systems (SRS) required by manufacturer/component supplier specifications

Testing equipment

- Testing equipment is to include pressure gauges, charge stations, reclaim units, recycling units, leak detectors, thermometers, flushing equipment, multi-meters, data scanners, test lights, test LED's, and may include lab oscilloscopes and manufacturer/component supplier testing equipment

Tests

- Tests to be conducted are to include wiring and connector integrity, operation and specification of input and output devices, controlling electronic components and computers, data interpretation and readings related to direct, indirect and intermittent causes

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to climate control systems
- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to climate control system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Complete failure analyses on a minimum of three (3) climate control systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and record the most appropriate rectification measure
- Analyse and validate or recommend variations to a minimum of two (2) available repair/modification procedures for climate control systems
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- In depth knowledge of air conditioning and heating principles
- General knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation
- Basic mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the types, functions and operations of climate control systems
- General knowledge of the theory of diagnosis including concept, design and planning

EVIDENCE GUIDE

Underpinning knowledge (continued)

- General knowledge of the concepts, types, functions, operations and limitations of electro mechanical and fluid sub-systems within climate control systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, organise and understand technical information related to contemporary climate control systems, monitoring and testing processes, diagnostic methods and options and safety procedures. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise activities including the planning of analytical processes, the establishment of evaluative (success) criteria, the preparation and layout of the worksite and the obtaining of testing equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. (Level 2)
Solve problems	Establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tools, calculators and measuring devices. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a realistic requirement and objective(s) for analysis and evaluation, operational climate control systems with real or simulated faults, monitoring processes and testing equipment appropriate to the objective(s), research facilities and technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5765A Develop and apply electrical systems modification

Unit descriptor

This unit covers the competency to develop, apply and validate significant modifications to existing electrical systems in order to sustain, vary or enhance performance. This includes the preparation and application of specifications and processes which comply with any safety, legal and commercial obligations.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the modification requirement	1.1 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.2 The purpose and objectives of the modification are identified from an analysis of inputs and confirmed as necessary with the customer
	1.3 Outline options for achieving the required purpose and objectives are identified, framed and presented to the customer prior to proceeding
	1.4 Possible legal and safety impacts of the modification are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Develop and validate the modification specification	2.1 Benchmark specifications for the existing electrical system are accessed and interpreted
	2.2 Criteria to be used in the selection of the modification method and in the evaluation of the outcomes are identified and documented
	2.3 The proposed modification method is selected following the identification, consideration and evaluation of the full range of available and relevant options
	2.4 The selected option, including material choices and processes, is developed in detail and progressively validated against the established criteria
	2.5 The modification specification is documented to industry and enterprise standards

ELEMENT	PERFORMANCE CRITERIA
3. Apply and test the modification specification	3.1 The selected modification method and process is followed in accordance with the established specifications
	3.2 The modification is completed using equipment, tools and material in accordance with accepted industry standards and practices
	3.3 Tests and testing equipment are applied in accordance with regulatory requirements, the manufacturer/ component supplier specifications and the modification specification
	3.4 Test results and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes
	3.5 Variations necessitated during the modification process or as a result of testing are incorporated into the modification specification
	3.6 Information and detail related to the modification is documented and provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	4.3 Waste and scrap is removed following workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	4.5 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Electrical modifications to be covered by this unit may include those to:
  - vary the performance of DC motors to meet changes in operational requirements.
  - vary the performance of alternators to meet changes in operational requirements.
  - change the electrical sequenced operating order of electric over hydraulic systems
  - convert vehicle from ground to insulated return
- Inputs to the modification method and processes may be obtained from customer requirements, manufacturer/ component supplier specifications, outcomes of diagnostic processes or from regulatory, licensing, intellectual property legislation, safety requirements and Australian Design Rules

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluation criteria

- Evaluation criteria, sometimes referred to as success factors, are established prior to a modification being undertaken and are to cover safety, functionality, survivability, maintainability life cycle cost and aesthetics

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

Tests and testing equipment

- Tests and testing equipment is to include that appropriate to the modification being carried out but it should include relevant computer-based diagnostic systems

RANGE STATEMENT

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to electrical systems modification
- Australian Design Rules
- Vehicle Industry Regulations
- Vehicle Industry Publications related to emerging electrical system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Correctly modify a significant electrical system or sub-system including:
  - the selection, development and recording of success factors and evaluation criteria before undertaking the modification
  - the selection, development and validation of the modification methodology, process(es) and specification
  - the application of the modification specification (methodology and process), and
  - the recording and reporting of the outcomes
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Electrical theory covering voltage, current, resistance, power, magnetics and inductance (including semi-conductors and electronic system applications)
- Electrical theory covering the concepts and principles of electrical, electrical and pneumatic systems
- Detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, and radio frequency
- General knowledge of the types, functions, operations and limitations of the main automotive industry electrical systems
- General knowledge of automotive digital computing systems
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting modification specifications and outcomes

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Collect, organise and understand legal and technical information related to contemporary automotive electrical systems modifications. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the development and planning of modification processes, the preparation and layout of the worksite and the obtaining of tools, equipment, material and testing equipment to avoid any back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate specifications, calibrate and establish testing equipment and evaluate modification results against pre-established criteria. (Level 2)
Solve problems	Establish modification methods and processes which anticipate and allow for risks and avoid or minimise reworking and avoid wastage. (Level 3)

EVIDENCE GUIDE

Underpinning skills (continued)

Use technology

Use the full range of workplace technology related to electrical systems modification including testing equipment, maintenance equipment, tools, calculators and measuring devices and information management systems.

(Level 2)

EVIDENCE GUIDE

Resource implications

- Access to operational electrical systems requiring modification, testing equipment as stipulated in the Range Statement, technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other projects

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5766A Develop and apply electronic systems modification

Unit descriptor

This unit covers the competency to develop, apply and validate significant modifications to existing electronic systems in order to sustain, vary or enhance performance. This includes the preparation and application of specifications and processes which comply with any safety, legal and commercial obligations.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the modification requirement	1.1 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.2 The purpose and objectives of the modification are identified from an analysis of inputs and confirmed as necessary with the customer
	1.3 Outline options for achieving the required purpose and objectives are identified, framed and presented to the customer prior to proceeding
	1.4 Possible legal and safety impacts of the modification are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Develop and validate the modification specification	2.1 Benchmark specifications for the existing electronic system are accessed and interpreted
	2.2 Criteria to be used in the selection of the modification method and in the evaluation of the outcomes are identified and documented
	2.3 The proposed modification method is selected following the identification, consideration and evaluation of the full range of available and relevant options
	2.4 The selected option, including material choices and processes, is developed in detail and progressively validated against the established criteria
	2.5 The modification specification is documented to industry and enterprise standards

ELEMENT	PERFORMANCE CRITERIA
3. Apply and test the modification specification	3.1 The selected modification method and process is followed in accordance with the established specifications
	3.2 The modification is completed using equipment, tools and material in accordance with accepted industry standards and practices
	3.3 Tests and testing equipment are applied in accordance with regulatory requirements, the manufacturer/ component supplier specifications and the modification specification
	3.4 Test results and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes
	3.5 Variations necessitated during the modification process or as a result of testing are incorporated into the modification specification
	3.6 Information and detail related to the modification is documented and provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	4.3 Waste and scrap is removed following workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	4.5 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Electronic modifications to be covered by this unit may include computer controlled systems where the process relates to three categories:

  1. Modification that is carried out external to the computer, utilising "off the shelf" components and modification to wiring circuitry

     Example

     Modification to an electronic engine management system, improving the performance of an ECU controlled engine cooling fan system that necessitates changes to relay circuitry.

  2. Modification that is carried out external to the computer, utilising electronic circuit design, development, manufacture, trial, evaluation, improvement, and commissioning

     Example

     Development of an electronic control unit to delay engine crank whilst sounding an alarm warning of impending start of hazardous equipment.

  3. Modification that is carried out internally in the computer, utilizing electronic circuit design, reprogramming, development, manufacture, trial, evaluation, improvement, and commissioning

     Examples are

     Rectification of an original internal computer design/operating deficiency

     Modification to an electronic engine management computer, to enhance the performance of an engine

     Modification to a computerised system, to disable a function no longer required by customer

- Inputs to the modification method and processes may be obtained from customer requirements, manufacturer/ component supplier specifications, outcomes of diagnostic processes or from regulatory, licensing, intellectual property legislation, safety requirements and Australian Design Rules

RANGE STATEMENT

Unit context	• OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
Evaluation criteria	• Evaluation criteria, sometimes referred to as success factors, are established prior to a modification being undertaken and are to cover safety, functionality, survivability, maintainability life cycle cost and aesthetics
Isolation procedures	• Equipment isolation procedures are to industry and enterprise standards
Equipment	• Equipment is to include that appropriate to the modification being carried out including electronic work station, desoldering station, electronic variable power supply, simulated vehicle system test facility, multi-meters, lab oscilloscopes, logic probe, data scanners and it should include relevant computer-based diagnostic systems
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and application procedures for testing equipment and material • Manufacturer/component supplier specifications, schematics and operational procedures related to electronic systems modification • Australian Design Rules • Vehicle Industry Regulations • Vehicle Industry Publications related to emerging electronic technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality
- Correctly modify a significant electronic system or sub-system including:
    - external modification (not within the computer) to a digital computer management system that enhances the system performance
    - external modification (not within the computer) to a digital computer management system, utilizing electronic circuit design, development, manufacture, trial, evaluation, improvement, and commissioning, that enhances the system performance
    - internal modification (within the computer) to a digital computer management system, utilizing electronic circuit design, reprogramming, development, manufacture, trial, evaluation, improvement, and commissioning that enhances the system performance
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- General knowledge of the types, functions, operations and limitations of the main automotive industry electronic systems
- General knowledge of automotive digital computing systems
- Detailed knowledge of electrical theory and operation covering, laws, theorems, DC and AC voltage, DC and AC current, resistance, power, capacitance, electrostatics, electromechanics, magnetics, inductance, reactance, time constants, resonance, filtering, discrete semi-conductor electronic components, colour codes, analog electronics, analogue IC, binary, logic families, digital IC, memory types and functions, micro processor principles, micro controller principles, analogue to digital conversion, signal processing, output control and characteristics, automotive digital computers, programming, networked vehicles, and radio frequency
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting modification specifications and outcomes

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Collect, organise and understand legal and technical information related to contemporary automotive electronic systems modifications.

(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the development and planning of modification processes, the preparation and layout of the worksite and the obtaining of tools, equipment, material and testing equipment to avoid any back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate specifications, calibrate and establish testing equipment and evaluate modification results against pre-established criteria. (Level 2)
Solve problems	Establish modification methods and processes which anticipate and allow for risks and avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the full range of workplace technology related to electronic systems modification including testing equipment, maintenance equipment, tools, calculators and measuring devices and information management systems. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to operational electronic systems requiring modification, testing equipment as stipulated in the Range Statement, technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other projects

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5771A Develop and apply gas fuel systems modification

Unit descriptor

This unit covers the competency to develop, apply and validate significant modifications to existing gas fuel systems in order to sustain, vary or enhance performance. This includes the preparation and application of specifications and processes which comply with any safety, legal and commercial obligations.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the modification requirement	1.1 OH&S requirements including equipment and system isolation requirements and personal protection needs are observed throughout the work
	1.2 The purpose and objectives of the modification are identified from an analysis of inputs and confirmed as necessary with the customer
	1.3 Outline options for achieving the required purpose and objectives are identified, framed and presented to the customer prior to proceeding
	1.4 Possible legal and safety impacts of the modification are considered and responded to in accordance with regulatory and enterprise obligations and practices
2. Develop and validate the modification specification	2.1 Benchmark specifications for the existing gas fuel system are accessed and interpreted
	2.2 Criteria to be used in the selection of the modification method and in the evaluation of the outcomes are identified and documented
	2.3 The proposed modification method is selected following the identification, consideration and evaluation of the full range of available and relevant options
	2.4 The selected option, including material choices and processes, is developed in detail and progressively validated against the established criteria
	2.5 The modification specification is documented to industry and enterprise standards

ELEMENT	PERFORMANCE CRITERIA
3. Apply and test the modification specification	3.1 The selected modification method and process is followed in accordance with the established specifications
	3.2 The modification is completed using equipment, tools and material in accordance with accepted industry standards and practices
	3.3 Tests and testing equipment are applied in accordance with regulatory requirements, the manufacturer/ component supplier specifications and the modification specification
	3.4 Test results and other diagnostic findings are verified, if necessary by using reliable alternate or optional processes
	3.5 Variations necessitated during the modification process or as a result of testing are incorporated into the modification specification
	3.6 Information and detail related to the modification is documented and provided to the appropriate parties in accordance with regulatory and commercial obligations
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Testing equipment and other support material are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and enterprise requirements
	4.3 Waste and scrap is removed following workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	4.5 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Gas fuel modifications to be covered by this unit may include those to
  - enhance engine performance
  - maintain emissions
  - meet Australian Design Rules
  - meet legislative requirements retrospectively
- Inputs to the modification method and processes may be obtained from customer requirements, manufacturer/ component supplier specifications, outcomes of diagnostic processes or from regulatory, licensing, intellectual property legislation, safety requirements and Australian Design Rules

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Evaluation criteria

- Evaluation criteria, sometimes referred to as success factors, are established prior to a modification being undertaken and are to cover safety, functionality, survivability, maintainability life cycle cost and ascetics

Isolation procedures

- Equipment isolation procedures are to industry and enterprise standards

Tests and testing equipment

- Tests and testing equipment is to include that appropriate to the modification being carried out but it should include relevant computer-based diagnostic systems

RANGE STATEMENT

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to gas fuel systems modification
- Australian Design Rules
- Gas Fuel Vehicle Regulations
- Vehicle Industry Publications related to emerging gas fuel systems technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - prevent damage and wastage of goods, equipment and products
    - maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Correctly modify a significant gas fuel system or sub-system including:
  - the selection, development and recording of success factors and evaluation criteria before undertaking the modification
  - the selection, development and validation of the modification methodology, process(es) and specification
  - the application of the modification specification (methodology and process), and
  - the recording and reporting of the outcomes
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- General knowledge of the theory of diagnosis including concept, design and planning
- Detailed knowledge of the concepts, types, functions, operations and limitations of gas fuel systems
- Detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment
- General knowledge of the methods and processes for recording and reporting diagnostic findings and recommendations
- General knowledge of personal computer operation

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Collect, organise and understand legal and technical information related to contemporary gas fuel systems modifications. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, the reporting of work outcomes and the completion of regulatory, commercial and vehicle information systems inputs. (Level 2)
Plan and organise activities	Plan and organise activities including the development and planning of modification processes, the preparation and layout of the worksite and the obtaining of tools, equipment, material and testing equipment to avoid any back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements, calculate specifications, calibrate and establish testing equipment and evaluate modification results against pre-established criteria. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Establish modification methods and processes which anticipate and allow for risks and avoid or minimise reworking and avoid wastage. (Level 3)
Use technology	Use the full range of workplace technology related to gas fuel systems modification including testing equipment, maintenance equipment, tools, calculators and measuring devices and information management systems. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to an operational gas fuel system requiring modification, testing equipment as stipulated in the Range Statement, technical information and a realistic work environment

Method of assessment

- Assessment of this competency is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include certification of compliance of the final outcome/product or authorisation for use by a competent authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other projects

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5773A Evaluate and select bodywork material, equipment and processes

Unit descriptor

This unit covers the competency to research and evaluate the full range of bodywork material, equipment and processes and to select that most appropriate for each particular specified application taking into account evolving technology and market needs.

ELEMENT	PERFORMANCE CRITERIA
1 Determine bodywork requirements	1.1 Requirements for bodywork activities are identified
	1.2 A framework and rating system is developed to facilitate comparisons of cost/benefits and other qualitative properties of material, equipment and processes
2 Gather data and specifications	2.1 Current best practice and future trends for undertaking bodywork are assessed to establish comparisons and benchmarks
	2.2 Steps required for bodywork processes are identified and flow charts produced where necessary
	2.3 Specifications are identified to match each bodywork process
	2.4 Consultations are conducted with relevant employees and management to identify additional or altered specifications
	2.5 Material, tools, and/or equipment requirements for the bodywork are identified and documented
	2.6 Existing material, equipment and stock on hand is evaluated to match requirements of the proposed processes
	2.7 OH&S requirements to provide safe work systems for the material, equipment and processes are identified
	2.8 Appropriate data is compiled and documented
3 Evaluate material, equipment and processes against requirements	3.1 Material are assessed for required quality, finish and conformity to standards
	3.2 Equipment options are identified
	3.3 Material, equipment and processes are selected based on comparisons of performance, cost and specifications compared to the prepared rating system
	3.4 Processes are documented to enterprise and industry standards

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- This unit covers the work involved in evaluating and selecting the material, equipment and processes for bodywork operations
- The unit applies to those with responsibility for resource coordination and leadership of others individually and in teams

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults
- Material and equipment options are to include those in general service in the industry and those identified as emerging technology

Workplace environment

- The function is undertaken in accordance with established enterprise procedures and practices may include requirements recommended by manufacturer/component supplier
- Customers and suppliers may be internal or external

Machines/equipment

- Machines/equipment may include:
  - any machine typically used in the bodyworks industry
  - micro-processor or computer controlled machines

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulation and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Sector trade journals and related publications
- Work procedures/instructions
- Manufacturer/component supplier specifications and instructions
- Standard forms of workplace process and procedure
- Organisation work specifications and requirements
- Australian Design Rules
- Legislation/regulations/national and industry codes and practices relevant to the product
- Quality and Australian standards and procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Locate, interpret and apply relevant information
- Apply safety requirements throughout the work sequence, including the use of personal protective clothing and equipment
- Lead others and work effectively to improve production quality and outcomes
- Evaluate material, equipment and bodywork processes considering:
    - material and equipment currently available
    - material and equipment innovations and potential
    - equipment capabilities and availabilities
    - workforce availability and capabilities
    - cost benefit analysis (or equivalent)
- Identify the impact of decisions in terms of commercial, environmental and safety risks
- Encourage participation of employees in the planning of work activities and changes

EVIDENCE GUIDE

Underpinning knowledge

- Industry sector developments and trends in terms of material and equipment
- Company or equivalent business policies and plans including forecast systems and products
- Company bodywork, market, work systems and existing equipment
- Legislative requirements of the bodywork activities

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Research, collect, organise and understand information related to bodywork material and equipment including the relevant technical, regulatory, environmental and safety requirements. (Level 3)
Communicate ideas and information	Communicate ideas and information to enable clarification of the requirements, coordination of work with managers/supervisors, workers and customers, the coordinated evaluation of options and the reporting of outcomes. (Level 2)
Plan and organise activities	Plan and organise activities including the systematic identification, research and evaluation of options. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly model the options and statistically compare results and potentials. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Solve problems	Create and apply systematic problem solving techniques which will anticipate variables and cater for evaluations and comparisons. (Level 3)
Use technology	Use the full scope of available workplace technology related to bodywork material and equipment and to their analysis and evaluation. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a full range of current and emerging bodywork technology information
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURT5776A Develop and document technical specifications and procedures

Unit descriptor

This unit covers the competency to analyse requirements and to develop and document technical procedures and specifications which provide concise and unambiguous direction and guidance for workplace activities.

ELEMENT	PERFORMANCE CRITERIA
1. Identify relevant requirements	1.1 Information required for technical procedures/specifications is identified and assembled
	1.2 Procedure/specification requirements and formats are established and confirmed, where necessary
	1.3 Requirements for information entry, storage, output and quality of document production are identified in accordance with enterprise procedures
	1.4 Procedure/specification document design is appropriate for efficient entry of information and satisfies appearance and presentation requirements for the purpose of the document
	1.5 Range of functions incorporated in the document design reflects the nominated requirements
2. Prepare technical specifications	2.1 Technical information for use in the specification is collected, tested and validated or confirmed before use
	2.2 Authoritative sources and references are identified and used in the preparation and presentation of the specification
	2.3 Specifications are written in an appropriate format, to ensure requirements can be met
	2.4 Specifications are written in a manner that is clear and understood in the workplace
	2.5 Specification documentation satisfies enterprise and industry standards
3. Prepare technical procedures	3.1 Activities and tasks are identified, analysed and documented
	3.2 Activities and tasks are sequenced and grouped into logical procedural clusters
	3.3 Procedures are documented to enterprise and industry standards

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope	• This unit covers the work involved in the research for and writing of technical specifications and procedures for the workplace • Specifications are technical criteria for an object, item, system or sub-system which describe the components, material, construction, circuitry and any associated legal, regulatory or intellectual property issues • Procedures contain detailed descriptions of the tasks, activities, sequences, material, tools, rules and safety requirements which lead or guide an individual through an authorised work practice • The function is undertaken in accordance with established enterprise procedures and practices may include requirements recommended by manufacturer/component supplier
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods codes and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, authorised handling procedures and organisation insurance requirements • Work requires individuals to demonstrate conceptual ability, discretion, judgement and problem solving skills
Workplace environment	• Work may involve individual and team related activities and will normally relate to the standard forms of activity performed in the enterprise and industry • Specifications and procedures may be used in established workshops or under external site conditions
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and application procedures for testing equipment and material
- Manufacturer/component supplier specifications, schematics and operational procedures related to systems
- Australian Design Rules
- Vehicle industry regulations
- Vehicle industry publications related to emerging system technology and technology changes

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Locate, interpret and apply relevant information
- Apply safety requirements throughout the work sequence, including the use of personal protective clothing and equipment
- Identify and itemise steps and stages in processes and procedures
- Complete a significant operational procedure, incorporating safety obligations, and covering:
- a full analysis of the topic area
- a step by step operational procedure, and
- supporting documents to the procedure

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Complete or review and update a technical specification for a significant system or sub-system which covers:
  - system/sub-system description
  - components
  - material
  - construction
  - circuitry
  - related information sources
  - legal, regulatory or intellectual property law requirements
- Modify products to cater for variations in workplace cultures and environment
- Work effectively with others

Underpinning knowledge

- Technical writing and presentation techniques
- Enterprise (or equivalent) technical procedure formats, content rules, preparation and management techniques

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information

Collect, organise and understand technical information related to the procedure and specification, testing processes, diagnostic methods and options and safety procedures.

(Level 2)

Communicate ideas and information

Communicate ideas and information to ensure the completeness, clarity and comprehension of the procedures and specifications by the target audience.

(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Plan and organise activities	Plan and organise to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly incorporate measurements, calibration and test requirements into procedures and specifications. (Level 2)
Solve problems	Establish processes which anticipate and allow for risks, cater for both direct and indirect causes, avoid or minimise reworking and avoid wastage in the preparation and content of procedures. (Level 3)
Use technology	Use the workplace technology related to document preparation including calculators and measuring devices, computing systems and information management systems. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to systems requiring specification, activities requiring procedural coverage, related technical information and a realistic work environment
Method of assessment	• Assessment of this competency is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include certification of compliance of the final outcome/product or authorisation for use by a competent authority • Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other projects
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility

AURT5777A Identify and calculate total costs of work

Unit descriptor

This unit covers the competency to estimate material, labour and time requirements and establish costs for the provision of automotive services (repairs, maintenance and modifications), including all overheads.

ELEMENT	PERFORMANCE CRITERIA
1. Gather information	1.1 Details of the particular service and competition services are obtained
	1.2 Details of the proposed service requirements are obtained and analysed
	1.3 Labour unit cost projections are obtained and agreed
	1.4 Logistic support contracts, supply agreements or equivalent are obtained and analysed
	1.5 Details of proposed warehousing and physical distribution systems and related cost factors are obtained
	1.6 Information is converted to usable form and stored ready for retrieval and application
2. Estimate material and labour	2.1 Types and quantities of material for the service are estimated and documented
	2.2 Time requirements for work activities and other lead times are estimated
	2.3 Labour requirements for direct services and related operations are estimated and documented
3. Determine/calculate overheads	3.1 Components contributing to overhead costs are identified
	3.2 Overhead costs to be attributed to work in accordance with commercial and enterprise procedures are identified
4. Calculate costs	4.1 Total material costs and labour costs are calculated in accordance with enterprise procedures
	4.2 Total service cost including overheads is calculated
	4.3 Final cost to customer is calculated, if necessary, in conjunction with accounting personnel

ELEMENT	PERFORMANCE CRITERIA
5. Document details and verify where necessary	5.1 Details of costs and charges are documented in accordance with enterprise practice
	5.2 Costs, calculations or other details are verified by other enterprise personnel
	5.3 Details are documented for future reference in accordance with enterprise practice

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves the estimating and total costing of automotive services (repair, maintenance and/or modification) for significant and non-routine activities involving a number of tradespersons and for which costing schedules are not available

Unit context

- OH&S requirements include vehicle industry regulations, safety management systems, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, Australian Design Rules, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate research, analytical, judgement and problem solving skills in the diagnosis of faults

Overhead costs

- Overheads may be calculated for a specific service or be a constant component based on historical records and may include such costs as rental/lease costs, utilities, non-production resources, depreciation of plant and equipment, warehousing margins, warehousing costs, insurance and other costs incurred by doing business

RANGE STATEMENT

Information and procedures

- Enterprise or equivalent financial management policy and procedures
- Enterprise or equivalent policy and procedures for cost and apportioning overheads
- Labour employment costs (awards, EBA, contracts)
- Material/supply costs (catalogues, contracts, standing agreements, market rates, warehousing margins)
- Australian, international and enterprise quality standards and procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Apply safety requirements throughout the work sequence, including the use of personal protective clothing and equipment
- Calculate the total costs of work for a significant non-routine service involving a number of tradespersons and without the aid of standard service costing schedules, using the following or equivalent steps:
  - obtain all information relevant to the determination of costs
  - interpret proposals, specifications and instructions for the work
  - estimate quantities of material required
  - determine the types and amount of labour required to complete the work
  - estimate time required to complete the work
  - determine/calculate overheads
  - document the process and outcomes
- Work effectively with others

EVIDENCE GUIDE

Underpinning knowledge

- General knowledge of work systems documentation processes
- General knowledge of enterprise costing procedures
- Detailed knowledge of mathematical formulae and processes relevant to costing
- General knowledge of components of labour costs
- General knowledge of enterprise/commercial approach to overhead costs
- General knowledge of enterprise/commercial approaches to warehousing and physical distribution costs
- General knowledge of enterprise information management processes, including storage requirements
- Detailed knowledge of the processes for identifying, apportioning, summarising and validating total costs for work

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process are required.

How will the candidate apply the following key competency in this unit?

The candidate will need to:

Collect, analyse and organise information	Collect, organise and understand information related to service costing including the relevant technical, commercial, industrial and accounting requirements. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable clarification of the work and related requirements and to present the outcomes in an appropriate manner. (Level 2)
Plan and organise activities	Plan and organise activities to avoid any back tracking and reworking of solutions. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly estimate and validate labour, material and on-costs and calculate work costs. (Level 2)
Solve problems	Create and apply systematic problem solving techniques to anticipate costing problems, avoid reworking and avoid wastage. (Level 2)
Use technology	Use the workplace technology related to costing including calculators and measuring devices and computing/computer aided systems. (Level 2)

Evidence Guide

Resource implications	• Access is required to real or appropriately simulated situations involving estimation and costing of service operations • Access is required to specifications and costs of relevant equipment and material and information on labour costs and availability, on-costs, safety costs, regulations, quality standards, and enterprise procedures • Access is required to all necessary facilities and associated equipment including calculators, computers and relevant software
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURV2501A Apply environmental regulations and best practice in the body repair industry

Unit descriptor

This unit covers the competency to prepare vehicle bodies for repair to identify and apply environmental regulation, and avoid potential hazards in the preparation of vehicle bodies for repair.

ELEMENT	PERFORMANCE CRITERIA
1. Apply relevant environmental regulations	1.1 Reasons for ethical environmental practice in a body repair workshop are identified
	1.2 Environmental responsibilities of employees in a body repair workshop are identified
	1.3 Penalties for individual breaches of the legislation are identified
	1.4 Waste is minimised, waste material including sludge and solids are sorted and stored in appropriate bins for recycling or disposal
	1.5 Packaging on goods received is sorted and reused or disposed of to recycling
2. Identify and avoid hazards to stormwater	2.1 No waste water or contaminants are allowed to enter the stormwater system
	2.2 All surface cleaning and preparation is undertaken in an impervious paved area and does not contaminate stormwater
	2.3 All parts and components containing environmentally hazardous material are stored undercover in a sealed and bunded or drained treatment area
	2.4 All paint, thinners/reducers are reused, recycled or stored in a bunded or drained area for collection by an approved disposal agent
	2.5 Spill kit is located and used as needed to prevent stormwater contamination
	2.6 Spills are cleaned up immediately and the workplace is kept clean to prevent unintentional stormwater pollution
3. Identify and avoid hazards to air quality	3.1 Paint is mixed in a well ventilated room
	3.2 Abrasive sanding is undertaken in an enclosed booth or chamber
	3.3 Clean up of guns and spraying equipment is conducted in an environmentally safe manner

ELEMENT	PERFORMANCE CRITERIA
3. Identify and avoid hazards to air quality (continued)	3.4 Hazards of airborne particles are identified, minimised and contained
	3.5 Hazards of gases and fumes are identified, minimised and contained
4. Identify and avoid noise hazards	4.1 Noise generating activities are minimised and carried out within approved operating hours

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves the normal activities of a body repair shop including removal and repair of metal and plastic panels and body components, preparation of panels for painting

  This unit is primarily aimed at those undertaking the qualification AUR22899 Vehicle Paint/Panel Preparer

Unit context

- OH&S requirements include material safety data sheets, hazardous substances and dangerous goods code and safe operating procedures
- Work is carried out in accordance with legislative obligations, environmental legislation, relevant OH&S, manual handling procedures and organisation insurance requirements
- Work requires individuals to demonstrate discretion, judgement and problem solving skills in undertaking environmentally sound work practices
- Competency may be demonstrated in workplaces involved in the repair of vehicle bodies, through the removal and replacement of body panels and the preparation of panels for painting

Tools and equipment

- Tools and equipment are to include spill kits, recycling bins and drums, bunded or drained wash bays and preparation areas, spray booths and vacuum/air extraction equipment waste water management system

RANGE STATEMENT

Material	• Material safety data sheets
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices. Face masks are available for rubbing back and painting
Information and procedures	• Environmental legislation, regulations, Australian Standards • Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets/cards • Workplace procedures relating to reporting and communication of environmental issues • Manufacturer/component supplier specifications and operational procedures • Site environmental policy

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence	• Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
	• Apply environmental regulations and best practice
	• Identify material used in the vehicle body repair process and assess their environmental impact
	• Follow work instructions, operating procedures and inspection processes to:
	  • minimise the risk of injury to self and others
	  • prevent damage and wastage of goods, equipment and products
	  • maintain required production output and product quality
	• Conduct operator maintenance on tools and equipment to ensure environmental efficiency
	• Work effectively with others

EVIDENCE GUIDE

Critical aspects of evidence (continued)	• Modify activities to cater for variations in workplace context and environment • Use of a spill kit
Underpinning knowledge	• Relevant aspects of environmental legislation and its implications to work being undertaken • Characteristics and potential environmental impact of products used in the body repair process • Philosophy of prevent, reduce, reuse, recycle • Procedures for reporting machinery faults and material defects • Internal reporting procedures for significant environmental damage occurring in the workplace

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to environmental procedures from legislation, regulations, policies, guidelines and workplace practices in a body repair workshop. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable all work undertaken is in accordance with environmental best practice, coordination of work with other workers and customers, and the reporting of work outcomes and problems. (Level 1)
Plan and organise activities	Plan and organise activities including the preparation of equipment and material and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use planning and checking techniques to avoid environmental contamination and wastage. (Level 1)
Use technology	Use the workplace technology related to environmental protection equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to a body repair workshop with damaged vehicles, metal and plastic panels and fillers, spray booth, various spray guns, paint mixing equipment, recycling bins, vacuum cleaners/brooms, liquid, sludge and solid wastes
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and should be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURV2803A Carry out minor sewing repairs and alterations

Unit descriptor

This unit covers the competency to carry out sewing operations and machine maintenance, which require supervision and minimum skills.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality and quantities of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements including personal protection needs, are observed throughout the work
	1.4 Material for repairs and alterations are selected and inspected for quality
	1.5 Correct hand and power tools are inspected for safe use.
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out minor hand and machine sewing procedures	2.1 Procedures are applied without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 All minor sewing procedures are carried out in accordance with manufacturer/component supplier specifications
	2.4 All minor sewing procedures are completed within established industry/enterprise guidelines
	2.5 All activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Carry out minor sewing machine maintenance procedures	3.1 Procedures are carried out without causing damage to any component/system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 All cleaning procedures are carried out to manufacturer/component supplier and enterprise guidelines

ELEMENT	PERFORMANCE CRITERIA
3. Carry out minor sewing machine maintenance procedures (continued)	3.4 All lubricating procedures are carried out to manufacturer/component supplier and enterprise guidelines
	3.5 All activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Waste and scrap is removed following workplace procedures.
	4.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	4.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	4.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Minor sewing repairs and alterations	• Small repairs and alterations to vehicle trim
Unit scope	• Work involves component remove and replacement repair of trims and trim alterations
Unit context	• OH&S requirements include building codes, safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in methods of minor trim repairs and alterations

RANGE STATEMENT

Unit context (continued)	• Competency may be demonstrated in workplaces involved in trim shops, dealerships, panel shops, detailers and accessory suppliers and installers
Tools and equipment	• Tools and equipment are to include hand and power tools and sewing machines and may include, but not be limited to special tools for dismantling/assembly, sewing machine, scissors, needles, knives, straight edge, tape, square, and marking chalk
Material	• Material are to include trim cloth and sewing material
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets, material safety data sheets and instructional material • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence	• Interpret work order and locate and apply relevant information • Apply safe handling requirements for equipment, products and material, including use of personal protective equipment • Read and interpret job sheets, instructional material, trim datasheets to prepare for work • Identify material used in the work process

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
- maintain required production output and product quality
- Identify, set up, operate and maintain sewing equipment and procedures to complete the following:
  - minor sewing repairs
  - alterations and minor machine maintenance.
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Relevant technical information
  - Equipment operation and safety requirements
  - Relevant manufacturer/component supplier and company policies
  - Personal safety requirements
  - Material matching procedures
  - Machine sewing procedures
  - Sewing methods appropriate to various material types
  - Planning minor sewing repairs and alterations processes and techniques
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels to manufactures, enterprise and customer requirements
  - Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to minor sewing repairs and alterations, work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 1)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 1)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 1)
Use technology	Use the workplace technology related to minor sewing repairs and alterations including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to manufacturer/component supplier specification as identified in the Range Statement, standard operating procedures, instructional information and job sheets
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURV2800A Carry out cleaning of vehicle windows

Unit descriptor

This unit covers the competency to carry out cleaning procedures on vehicle/plant windscreens and windows.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment and quantities
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for glass cleaning is selected and inspected for quality
	1.5 Cleaning equipment is identified and checked for safe and effective operation
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Apply washing and squeegee procedures to glass surface	2.1 Apply washing and squeegee procedures to glass surface without causing damage to any machinery or equipment
	2.2 Cleaning procedures are carried out using approved methods and equipment, according to recognised enterprise requirements
	2.3 All activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures
3. Clean up work area and maintain equipment	3.1 Material that can be reused is collected and stored
	3.2 Waste and scrap is removed following workplace procedures
	3.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	3.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	3.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	3.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Cleaning of vehicle windows	• Windows to include fixed and movable windscreens and windows • Equipment to include industry accepted cleaning items
Unit scope	• Work involves washing, scraping, cleaning and drying of vehicle windows and windscreens
Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in removing grime, adhesives, paint, dried encrustation, exhaust pollution and smog • Competency may be demonstrated in workplaces involved in detailing, linking, glazing, body repairs, vehicle sales
Tools and equipment	• Tools and equipment are to include squeegees, hoses, buckets, brushes, applicators, chammies and scrapers and may include, but not be limited to high pressure cleaners and car washes.
Material	• Material are to include detergents, solvents, chemicals, lint free cloths
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices, waterproof footwear, clothing and gloves
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets, material safety data sheets, chemical application and instructional material • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret job sheets, cleaning instructional material to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - Minimise the risk of injury to self and others
  - Prevent damage and wastage of goods, equipment and products
  - Maintain required production output and product quality
- Identify, set up, operate and maintain cleaning equipment to complete the following:
  - Cleaning of vehicle windscreens and windows.
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

The types, characteristics, uses and limitations of different methods of cleaning for different applications

- Planning cleaning processes and techniques
- Characteristics of material and uses of products to produce suitable clean surfaces for general applications and window tinted surfaces
- Equipment maintenance procedures
- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels
- Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to glass cleaning, work orders, plans and safety procedures. (Level 1)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 1)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and cleaning problems, avoid re working and avoid wastage. (Level 2)
Use technology	Use the workplace technology related to glass cleaning including tools and equipment. (Level 1)

EVIDENCE GUIDE

Resource implications	• Access to data and information material as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURV2801A Carry out minor panel repairs

Unit descriptor

This unit covers the competency to carry out panel repairs to pre-paint condition, which requires supervision and minimum skills.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment and quantities
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including breathing protection, personal protection needs, are observed throughout the work
	1.4 Material for application is selected and inspected for quality
	1.5 Correct hand and power tools are identified and checked for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out minor panel repairs	2.1 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.2 Protective clothing and equipment appropriate to the repair activities are used
	2.3 Components are repaired using approved methods and equipment in accordance with manufacturer/component supplier specifications
	2.4 Where minor repair of components includes disturbance to electrical, mechanical, air conditioning systems or trim, appropriate authorised assistance is sough where required
	2.5 Repairs are carried out to pre-paint condition
	2.6 Repair activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies

ELEMENT	PERFORMANCE CRITERIA
3. Carry out minor repairs using body fillers	3.1 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.2 Protective clothing and equipment appropriate to the repair activities are used
	3.3 Components are repaired using approved methods and equipment in accordance with manufacturer/component supplier specifications
	3.4 Repairs are carried out to pre-paint condition
	3.5 Repair activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Waste and scrap is removed following workplace procedures
	4.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	4.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	4.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Unit scope

- Work involves paint panel and trim removal, prepare panels to pre-paint condition

RANGE STATEMENT

Unit context	• OH&S requirements include safety management systems, hazardous substances and dangerous goods code, safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in methods of minor panel repairs • Competency may be demonstrated in workplaces involved in panel repair, dealerships, detailing establishments, general repairs
Tools and equipment	• Tools and equipment are to include hand and power tools, vehicle protection and may include, but not be limited to: templates, special tools and lifting equipment
Material	• Material are to include fillers, adhesives, abrasives and primers
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures	• Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets, material safety data sheets, chemical application and instructional material • Workplace procedures relating to reporting and communication • Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret job sheets and filler material safety data sheets to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Identify, set up, operate and maintain panel repair equipment and procedures to complete the following:
  - minor panel repairs
  - application of fillers
  - application of protective coatings
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Personal protective procedures and equipment
  - Vehicle safety requirements
  - Technical information
  - Types of body fillers and applications
  - Types of adhesives
  - Types of abrasives
  - Equipment maintenance procedures

EVIDENCE GUIDE

Underpinning knowledge (continued)

- Basic body filler repair procedure
- Basic panel beating
- Planning body repair methods, processes and techniques.
- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels
- Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to minor body repairs and work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 1)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)

EVIDENCE GUIDE

Underpinning skills (continued)

Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 2)
Use technology	Use the workplace technology related to minor body repairs including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to data and information material as identified in the Range Statement, standard operating procedures
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
Context/s of assessment	• Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURV2804A Carry out minor trimming repairs and alterations

Unit descriptor This unit covers the competency to measure, cut, fabricate, and attach material covers to relevant vehicle components.

Prerequisites AUR 31368A Select and apply trim/fabric adhesives

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality, material, equipment and quantities
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for repairs and alterations are selected and inspected for quality
	1.5 Correct hand and power tools are identified and checked for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Match, measure and cut relevant material	2.1 Work is completed without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 All matching, measuring and cutting procedures are carried out in accordance with manufacturer/component supplier specifications
	2.4 All matching, measuring and cutting procedures are completed within established industry/enterprise guidelines
	2.5 All activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies

ELEMENT	PERFORMANCE CRITERIA
3. Fabricate trim/covers to suit relevant vehicle components	3.1 Fabrication is achieved without causing damage to any component/system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 Trim/cover fabrication of procedures are carried out in accordance with manufacturer/component supplier specifications
	3.4 All fabrication procedures are complete within established industry/enterprise guidelines
	3.5 All activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies
4. Attach material cover to relevant vehicle/ component	4.1 Material is attached without causing damage to any component or system
	4.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	4.3 All attaching procedures are completed in accordance with manufacturer/component supplier specifications
	4.4 All attaching procedures are completed within established industry/enterprise guidelines
	4.5 All activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies
5. Clean up work area and maintain equipment	5.1 Material that can be reused is collected and stored
	5.2 Waste and scrap is removed following workplace procedures
	5.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	5.4 Unserviceable equipment is tagged and faults identified in accordance with workplace
	5.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	5.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Carry out minor trimming repairs/alterations	• Small repairs and alterations to vehicle trim
Unit scope	• Work involves removing, repairing, fabricating, altering vehicle trim components
Unit context	• OH&S requirements include, safety management systems, hazardous substances and dangerous goods code, safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in selecting, altering, fabricating and applying trim material • Competency may be demonstrated in workplaces involved in trim shops, dealerships, audio, alarm, communications equipment installations
Tools and equipment	• Tools and equipment are to include hand and power tools and may include, but not be limited to: special tools for dismantling/assembly, staple gun, hammers, wad punches, heat gun, foam cutter, scissors, knives, revolving hole punch, ruler, tape, hand clamps, adhesive gun, pop rivet kit, punch, and die set, hog ring pliers, door handle remover, hacksaw, sander, staple and tack remover, scrapers and putty knives, stuffing irons and vacuum formers
Material	• Material are to include trim, adhesives, fabrication material and appropriate components
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

RANGE STATEMENT

Information and procedures

- Workplace procedures relating to the use of tools and equipment
- Work instructions, including job sheets, material safety data sheets, chemical application and instructional material
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret job sheets, instructional material to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - Minimise the risk of injury to self and others
  - Prevent damage and wastage of goods, equipment and products
  - Maintain required production output and product quality
- Identify, set up, operate and maintain trim repairs equipment and procedures to complete the following:
  - Minor trim repairs
  - Application of adhesives
  - Minor sewing operations
  - Fabrication techniques
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

EVIDENCE GUIDE

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Removal and replacement methods
  - Measuring/testing and adjustment procedures
  - Relevant technical and legal requirements
  - Equipment safety requirements
  - Relevant manufacturer/component supplier and company policies
  - Types and use of various material
  - Personal safety requirements
  - Material safety requirements
  - Trim fabrication, matching, measuring and cutting procedures
- Planning minor trim repairs, fabrication processes and techniques
- Workplace safety policies and procedures
- Workplace guidelines regarding acceptable tolerance levels
- Procedures for reporting faults and material defects

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to trimming, fabrication adhesives, material and work orders, plans and safety procedures for fabricating a component or piece of equipment.

(Level 2)

EVIDENCE GUIDE

Underpinning skills (continued)

Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 1)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 1)
Use technology	Use the workplace technology related to trimming and fabrication procedures including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications	• Access to manufacturer/component supplier specification as identified in the Range Statement, standard operating procedures, instructional information and job sheets
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

EVIDENCE GUIDE

Context/s of assessment	Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURV3501A Implement and monitor environmental regulations and best practice in the body repair industry

Unit descriptor

This unit covers the competency to undertake the repair of vehicle bodies in a manner that ensures the protection of the environment.

ELEMENT	PERFORMANCE CRITERIA
1. Implement relevant environment regulations	1.1 Reasons for ethical environmental practice in a body repair workshop are identified
	1.2 Environmental responsibilities of employees in a body repair workshop are identified
	1.3 Penalties for individual breaches of the legislation are identified
	1.4 Waste is minimised, waste material including sludge, solids and other wastes are sorted and stored in appropriate bins for recycling or disposal
	1.5 Packaging on goods received is sorted and reused or disposed of to recycling
2. Monitor and avoid hazards to stormwater	2.1 No waste water or contaminants are allowed to enter the stormwater system
	2.2 All surface cleaning and preparation is undertaken in a impervious paved area and does not contaminate stormwater
	2.3 All parts and components containing environmentally hazardous material are stored undercover in a sealed and bunded or drained treatment area
	2.4 All liquid wastes are drained into appropriate storage or recycling containers
	2.5 All paint, thinners/reducers are reused, recycled or stored in a bunded or drained area for collection by an approved disposal agent
	2.6 Spill kit is located and used as needed to prevent stormwater contamination
	2.7 Spills are cleaned up immediately and the workplace is kept clean to prevent unintentional stormwater pollution

ELEMENT	PERFORMANCE CRITERIA
3. Monitor and avoid hazards to air quality	3.1 Spray painting is conducted in an approved spray booth
	3.2 Paint is mixed in a well ventilated room
	3.3 Abrasive sanding is undertaken in an enclosed booth or chamber
	3.4 Hazards of airborne particles are monitored, minimised and contained
	3.5 Welding is conducting in a well ventilated area
	3.6 All CFCs, HCFCs and blends from air conditioning systems are recovered for recycling or approved disposal during servicing or decommissioning
	3.7 Spray booth is maintained to ensure it is operating with manufacturer/component supplier specifications
	3.8 Clean up of guns and spraying equipment is conducted in an environmentally safe manner
4. Monitor and avoid noise hazards	4.1 Noise generating activities are minimised and carried out within approved operating hours

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates Fholistic assessment. The following variables may be present for this particular unit**:**

Automotive body repair workshop	• Panel removal, repair and replacement procedures • Component removal procedures • Panel surface cleaning and paint application
Unit scope	• Work involves the normal activities of a body repair shop including removal and repair of metal and plastic panels and body components, welding, preparation of panels for painting and painting with a range of vehicle paints • This unit is primarily aimed at those undertaking qualifications AUR31699 Panel Beater and AUR31899 Vehicle Painting

RANGE STATEMENT

Unit context	• OH&S requirements include material safety data sheets, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, policies, guidelines, relevant OH&S, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills in undertaking environmentally sound work practices • Competency may be demonstrated in workplaces involved in the repair of vehicle bodies, through the repair, replacement or painting of body panels which may be metal or plastic
Tools and equipment	• Tools and equipment are to include spill kits, recycling bins and drums, spray gun washers, bunded or drained wash bays, spray booths, vacuum/air extraction equipment and a waste water management system
Material	• Material safety data sheets
Personal protective equipment	• Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices. Face masks are available for rubbing back and painting and ear muffs for protection against noise generated from machinery
Information and procedures	• Environmental legislation, regulations, relevant Australian standards and advice • Site environmental policy • Workplace procedures relating to the use of tools and equipment • Work instructions, including job sheets • Workplace procedures relating to reporting and communication of environmental issues • Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Implement environmental regulations and best practice
- Identify material used in the body repair process and assess their environmental impact
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self and others
  - prevent damage and wastage of goods, equipment and products
  - maintain required production output and product quality
- Conduct operator maintenance on spray booth and spray equipment to ensure environmental efficiency
- Work effectively with others
- Use of spill kit
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Relevant aspects of environmental legislation and its implications to work being undertaken
- Characteristics and potential environmental impact of products used in the body repair process
- Philosophy of prevention, reduce, reuse, recycle
- Procedures for reporting machinery faults and material defects
- Action to be taken in case of significant environmental threat in the workshop
- Reporting procedures for significant environmental damage occurring in the workshop

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to environmental procedures from legislation, regulations and workshop practices in a body repair workshop. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable all work undertaken is in accordance with environmental best practice, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation of equipment and material and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 3)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 2)
Solve problems	Use planning, checking and inspection techniques to avoid environmental contamination and wastage. (Level 2)
Use technology	Use the workplace technology related to environmental protection equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to a body repair workshop with damaged vehicles, metal and plastic panel repair equipment and fillers, spray booth, various spray guns, paint mixing equipment, recycling bins, dust extraction equipment, vacuum cleaners/brooms and liquid, sludge and solid wastes
- Access to a least two of the paint types listed; water based, acrylic, two pack, or thinners/reducers

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURV3802A Carry out sewing operations

Unit descriptor This unit covers the competency to carry out sewing operations including hand and machine operation.

Prerequisite AURV2803A Carry out minor sewing repairs and alterations

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Work instructions are used to determine job requirements including quality and quantity of material
	1.2 Job specifications are read and interpreted
	1.3 OH&S requirements, including personal protection needs, are observed throughout the work
	1.4 Material for sewing are selected and inspected for quality
	1.5 Correct hand and tools are inspected for safe use
	1.6 Products are determined to minimise waste material
	1.7 Procedures are identified for maximising energy efficiency whilst completing the job
2. Carry out hand and machine sewing procedures	2.1 Procedures are applied without causing damage to any component or system
	2.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	2.3 All sewing procedures are carried out in accordance with manufacturer/component supplier specifications
	2.4 All sewing procedures are completed within established industry/enterprise guidelines
	2.5 All activities are carried out according to industry regulations/guidelines, OH&S requirements, legislation and enterprise procedures/policies
3. Carry out sewing machine maintenance procedures	3.1 Procedures are carried out without causing damage to any component/system
	3.2 Correct information is accessed and interpreted from appropriate manufacturer/component supplier specifications
	3.3 All cleaning procedures are carried out to manufacturer/component supplier and enterprise guidelines
	3.4 All lubricating procedures are carried out to manufacturer/component supplier and enterprise guidelines

ELEMENT	PERFORMANCE CRITERIA
3. Carry out sewing machine maintenance procedures (continued)	3.5 All activities are carried out according to industry regulations/guidelines. OH&S requirements, legislation and enterprise procedures/policies
4. Clean up work area and maintain equipment	4.1 Material that can be reused is collected and stored
	4.2 Waste and scrap is removed following workplace procedures
	4.3 Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures
	4.4 Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	4.5 Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures
	4.6 Tooling is maintained in accordance with workplace procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Carry out sewing operations	• Sewing of material and maintenance of machines
Unit scope	• Work involves hand sewing, machine sewing, matching of material, measuring, cutting, over locking. Methods should be applied under normal operating conditions
Unit context	• OH&S requirements include building codes, safety management systems, hazardous substances and dangerous goods code, safe operating procedures
	• Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements
	• Work requires individuals to demonstrate discretion, judgement and problem solving skills in sewing, material matching, measuring, cutting and maintaining machinery
	• Competency may be demonstrated in workplaces involved in trim shops

RANGE STATEMENT

Tools and equipment

- Tools and equipment are to include hand and power tools and sewing machines and may include, but not be limited to: scissors, needles, knives, straight edge, tape and square making chalks

Material

- Material are to include trim cloth, canvas, plastic sheeting, leather

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Workplace procedures relating to the use of tools and equipment.
- Work instructions, including job sheets, material safety data sheets and instructional material
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical aspects of evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and material, including use of personal protective equipment
- Read and interpret job sheets, instructional material, trim datasheets to prepare for work
- Identify material used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - Minimise the risk of injury to self and others
  - Prevent damage and wastage of goods, equipment and products
  - Maintain required production output and product quality

EVIDENCE GUIDE

Critical aspects of evidence (continued)

- Identify, set up, operate and maintain sewing equipment and procedures to complete the following
- Conduct operator maintenance sewing machines
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment.

Underpinning knowledge

- The types, characteristics, uses and limitations of:
  - Relevant technical information
  - Equipment operation and safety requirements
  - Relevant manufacturer/component supplier and company policies
  - Personal safety requirements
  - Material matching procedures
  - Machine sewing procedures
  - Sewing methods appropriate to various material types
  - Machine maintenance procedures
  - Planning sewing operations and machine maintenance processes and techniques
  - Characteristics of material and uses of products produced for use in motor vehicles recreational vehicles, marine, aircraft, heavy vehicle, plant and agricultural equipment
  - Workplace safety policies and procedures
  - Workplace guidelines regarding acceptable tolerance levels to manufactures, enterprise and customer requirements
  - Procedures for reporting faults and material defects

EVIDENCE GUIDE

Underpinning skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to sewing operations and machine operations, work orders, plans and safety procedures for fabricating a component or piece of equipment. (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems. (Level 2)
Plan and organise activities	Plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and material to avoid any back tracking, workflow interruptions or wastage. (Level 2)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity. (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements. (Level 3)
Solve problems	Use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material. (Level 3)
Use technology	Use the workplace technology related to sewing of material including tools and equipment. (Level 2)

EVIDENCE GUIDE

Resource implications

- Access to manufacturer/component supplier specification as identified in the Range Statement, standard operating procedures, instructional information and job sheets

Method of assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency

Context/s of assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines

AURV4501A Plan and manage compliance with environmental regulations and best practice in the body repair industry

Unit Descriptor

This unit covers the competency to plan and implement an appropriate management system that ensures the protection of the environment in a body repair business.

ELEMENT	PERFORMANCE CRITERIA
1. Plan and manage compliance with relevant environment regulations	1.1 Reasons for ethical environmental practice in a body repair workshop are identified
	1.2 Environmental responsibilities of employers and employees in a body repair workshop are identified
	1.3 Penalties for company and employee breaches of the legislation are identified
	1.4 Waste products are minimised and facilities provided for waste material to be stored in appropriate bins for recycling or disposal
	1.5 Collection and recycling arrangements are sourced and implemented for liquids, sludge, solids and other waste
	1.6 Suppliers with minimal excess packaging on goods received are sourced. Packaging on goods received is sorted and disposed of appropriately
	1.7 Waste and energy conservation strategies are identified and implemented
2. Manage potential hazards to stormwater systems to avoid contamination	2.1 Systems are in place to ensure waste water does not enter the stormwater system
	2.2 All drains are identified on a site map or directly indicating where they flow
	2.3 Appropriate trade waste permits are in place
	2.4 Impervious paved, undercover and bunded or drained treatment area(s) are provided and used for all surface cleaning and preparation
	2.5 Undercover and bunded or drained area(s) are provided and used for the storage of all parts and components containing environmentally hazardous material
	2.6 Clearly identifiable storage or recycling containers are provided for all liquid wastes

ELEMENT	PERFORMANCE CRITERIA
2. Manage potential hazards to stormwater systems to avoid contamination (continued)	2.7 Oil separator and pits are cleaned and maintained regularly as per manufacturer/component supplier specifications
	2.8 Spill kit is provided and used as needed to prevent stormwater contamination by staff trained in its use
	2.9 Workplace is kept clean to prevent unintentional stormwater pollution
3. Manage potential hazards to air quality to avoid contamination	3.1 Compliant spray booth is provided and maintained with all spray painting conducted in it
	3.2 A well ventilated room attached to the spray booth is provided for paint mixing
	3.3 An enclosed booth or chamber is provided for all abrasive sanding to be undertaken in
	3.4 A well ventilated area is provided for any welding activities
	3.5 All CFCs, HCFCs and blends from air conditioning systems are recovered for recycling or approved disposal during servicing or decommissioning
	3.6 Clean up of guns and spraying equipment is conducted in an environmentally safe manner
	3.7 Hazards of gases and fumes are identified, minimised and contained
4. Minimisation of noise hazards is planned and managed	4.1 Noise generating activities are minimised and carried out within approved operating hours
	4.2 Fixed machinery is fitted with silencers or surrounded by noise containment material
5. Management systems	5.1 An environmental policy and contingency plan suitable to the needs of the business is developed and implemented
	5.2 Waste to landfill is calculated and possible savings through reuse and recycling are calculated
	5.3 Payback period on environmental equipment is calculated
	5.4 Manage staff adherence to environmental responsibilities
	5.5 Environmental records are accurately and legibly maintained and stored securely in a form accessible for reporting procedures

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit**:**

Automotive Body Repair Workshop	• Panel removal, repair and replacement • Panel surface cleaning and paint application
Unit Scope	• Work involves the planning and management of normal activities of a body repair shop including removal and repair of metal and plastic panels and body components, welding, preparation of panels for painting and vehicle painting This unit is applicable to the body repair stream qualification at both the Certificate IV and V level
Unit Context	• OH&S requirements include material safety data sheets, hazardous substances and dangerous goods code and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant OH&S, manual handling procedures and organisation insurance requirements • Work requires individuals to demonstrate discretion, judgement and problem solving skills to improve environmental performance by reducing environmental risk and waste • Competency may be demonstrated in workplaces involved in the repair of vehicle bodies and the replacement or painting of body panels which may be metal or plastic
Tools and Equipment	• Tools and equipment are to include spill kits, recycling bins and drums, spray gun washers, bunded/drained wash bays, spray booths, vacuum/air extraction equipment, oil water separators waste water management systems, quick break degreasing compounds and silt traps • Resources may include pressure washing and facilities for the use of recycled water and containment facilities for hazardous substances

RANGE STATEMENT

Material

- Material safety data sheets, manufacturer/component supplier specifications, environmental records, costings of equipment and waste removal and may include staff environmental induction material

Personal Protective Equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices. Face masks are available for rubbing back and painting. Ear muffs

Information and Procedures

- Environmental legislation, regulations and advice
- Workplace procedures relating to the use of tools and equipment
- Work instructions and procedures
- Site environmental policy
- Workplace procedures relating to reporting and communication
- Manufacturer/component supplier specifications and operational procedures
- Local council and waterways regulation

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Range Statement.

Critical Aspects of Evidence

- Plan and manage safe handling requirements for equipment, products and material, including use of personal protective equipment
- Plan and manage environmental protection procedures in the business
- Identify material used in the repair process and assess and manage their environmental impact
- Effective recycling processes are in place
- Plan and manage work instructions, operating procedures and inspection processes to:
    - minimise the risk of injury to self and others
    - maintain a clean workplace
    - prevent damage and wastage of goods, equipment and products

EVIDENCE GUIDE

Critical Aspects of Evidence (continued)

- Dispose of waste in accordance with legislative requirements and best practice
- Maintain required production output and product quality
- Report significant environmental damage or spills
- Plan and manage maintenance on spray booth and spray equipment to ensure environmental efficiency
- Manage effective planning and team work related to environmental best practice
- Develop/implement or audit an existing business environmental policy which covers at a minimum; waste, recycling, hazards to stormwater, air quality, noise, energy minimisation and costs
- Modify activities to cater for variations in workplace context and environment

Underpinning Knowledge

- Relevant aspects of environmental legislation and its relationship with OH&S, financial and risk management
- Requirements for trade waste permits
- Spill clean up procedures
- Characteristics and potential environmental impact of products used in the body repair process
- Philosophy of sustainability through prevention, reuse, reduce, recycle
- Procedures for rectifying machinery faults and material defects
- Action to be taken in case of significant environmental threat in the workplace
- Reporting procedures for significant environmental damage occurring in the workplace
- Cleaner production and eco-efficient strategies to avoid the production of waste

EVIDENCE GUIDE

Underpinning Skills

These include a number of processes that are learnt throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The questions below highlight how these processes are applied in this competency unit. The number in brackets indicates the level to which the key competency needs to be demonstrated where (1) is where work is within set conditions and process, (2) is where the management or facilitation of conditions or process is exercised, and (3) is where the design and/or development of conditions or process is required.

How will the candidate apply the following key competency in this unit?	The candidate will need to:
Collect, Analyse and Organise Information	Collect, organise and understand information related to environmental procedures from legislation, regulations, policies, guidelines, standards and workplace best practice in a body repair business. (Level 3)
Communicate Ideas and Information	Communicate ideas and information to enable all work undertaken is in accordance with environmental best practice. Support from stakeholders is actively sought for implementing suitable innovation and continuous improvement. (Level 3)
Plan and Organise Activities	Plan and organise activities including the preparation of equipment and material, recycling and waste management system and the selection of appropriate worksite to avoid any environmental contamination, back tracking, workflow interruptions or wastage. (Level 3)
Work with Others and in a Team	Promote work with others and in a team by recognising dependencies and using cooperative approaches to minimise wastage, optimise workflow and productivity. (Level 2)
Use Mathematical Ideas and Techniques	Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements and calculate wastage rates of various methods. (Level 3)
Solve Problems	Use planning, checking and inspection techniques to avoid environmental contamination and wastage. (Level 3)

EVIDENCE GUIDE

Underpinning Skills (continued)

Use Technology Use the workplace technology related to environmental protection and recycling equipment.

(Level 2)

EVIDENCE GUIDE

Resource Implications

- Access to a body repair workshop with damaged vehicles, metal and plastic panels/components repair equipment and fillers, spray booth, various spray guns, paint mixing equipment, recycling bins, bunded or drained preparation area and/or wash bays, quick break degreasing agents liquid, sludge and solid wastes
- Access to water-based, acrylic, two-pack paints, and thinners/reducers
- Access to a bunded or drained system, recycling systems, oil/water separator and trade waste in a body repair workshop

Method of Assessment

- Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts
- Assessment should be by direct observation of tasks and questioning on underpinning knowledge
- Assessment should be conducted over time and may be in conjunction with assessment of other units of competency
- Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance of the final outcome/product or authorisation for use by a component authority
- Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstances, but is able to be transferred to other circumstances

Context/s of Assessment

- Assessment may occur on the job or in a workplace simulated facility with relevant process equipment, material, work instructions and deadlines