



**Australian Government**

# **AURPTA3011 Repair pumping systems**

**Release 1**

## AURPTA3011 Repair pumping systems

### Modification History

Release	Comment
Release 1	Replaces AURP347666B Repair pumping systems Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation

### Unit Descriptor

Unit descriptor	<p>This unit of competency describes the skills and knowledge required to carry out testing and repair of centrifugal and positive displacement pumping systems for outdoor power equipment.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
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### Application of the Unit

Application of the unit	<p>This unit applies to individuals who undertake testing and repair of pumping systems in the outdoor power equipment industry.</p> <p>Pumping systems include centrifugal pumps as used for firefighting, irrigation and water transfer, high-pressure piston pumps as used in pressure cleaners, and diaphragm pumps as used in orchard spraying.</p>
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### Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to undertake test	1.1. Confirm nature and scope of work requirements 1.2. Identify and source procedures, information and tooling required 1.3. Analyse method options, select those most appropriate to the circumstances and make preparations 1.4. Source technical and/or calibration requirements for testing and prepare support equipment 1.5. Identify chemical cleaning agents, their safe handling and disposal methods with respect to environmental requirements
2. Conduct test and analyse results	2.1. Observe workplace health and safety (WHS) requirements, including individual state/territory regulatory requirements and personal protection needs, throughout the work 2.2. Carry out tests in accordance with workplace procedures and manufacturer/component supplier specifications 2.3. Compare test results with specifications to indicate compliance or non-compliance 2.4. Document results with evidence and supporting information and make recommendations 2.5. Process report or forward to persons for action in accordance with workplace procedures
3. Prepare for repair operation	3.1. Confirm work to be carried out 3.2. Plan repair operation, including post-repair testing 3.3. Access and interpret service procedures, workshop manuals and manufacturer information 3.4. Identify and prepare tools, equipment and materials required for servicing job 3.5. Set up work area
4. Repair pumping system	4.1. Identify and observe applicable WHS requirements, including state/territory regulatory requirements and personal protection needs 4.2. Select tooling and equipment to meet job requirements and check to ensure they are in good working order 4.3. Repair pump system following manufacturer/component supplier recommended procedures and specifications

ELEMENT	PERFORMANCE CRITERIA
	<p>4.4. Complete repair operations without causing damage to any vehicle/machine or component</p> <p>4.5. Make necessary adjustments in accordance with manufacturer/component supplier specifications</p>
5. Complete work and return unit to customer	<p>5.1. Complete repair schedule documentation and update customer and warranty information as required</p> <p>5.2. Inspect repaired unit to ensure protective guards, cowlings and safety features are in place</p> <p>5.3. Clean unit to workplace expectations</p> <p>5.4. Clean work area, dispose of waste, and store tools and equipment in accordance with workplace procedures</p> <p>5.5. Provide customer report on repair and explain use and care of equipment and warranty requirements</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

##### Required skills include:

- technical skills to the level required to use workplace technology and tools related to testing and repairing pumping systems
- communication skills to the level required to confirm work requirements and specifications, to communicate effectively regarding work requirements with supervisor, other workers and customers, to report work outcomes and problems, and to relate to people from a range of social, cultural and ethnic backgrounds and of varying physical and mental abilities
- literacy skills to the level required to understand information related to work orders and to locate, interpret and apply manufacturer/component supplier information, workplace policies and procedures
- numeracy skills to the level required to correctly calculate time, assess test results, apply accurate measurements, calculate material requirements and establish quality checks
- problem-solving skills to the level required to plan and organise activities and establish safe and effective work processes which anticipate and/or resolve problems and downtime, and to systematically develop solutions to avoid or minimise reworking and avoid wastage
- team skills to the level required to work effectively and cooperatively with others to optimise workflow and productivity

#### Required knowledge

##### Required knowledge includes:

- operating principles of positive and non-positive displacement pumping systems
- chemical cleaning agents and HAZCHEM warnings
- identification of the unit application, purpose and operation
- identification of component parts to include physical, fluid, gases and heat generation
- types, characteristics, uses and limitations of centrifugal and positive displacement pumps
- pressure and force and their relationship to each other
- types and causes of problems in pumping systems
- types and layout of service/repair manuals (hard copy and electronic)
- pump system service procedures
- selection, checking and use of tooling and equipment
- manufacturer and/or component supplier specifications
- applicable commonwealth, state or territory legislation, regulations, standards and

**REQUIRED SKILLS AND KNOWLEDGE**

codes of practice, including WHS and environment, relevant to testing and repairing pumping systems

- organisational policies and procedures, including quality requirements, reporting and recording procedures, and work organisation and planning processes, related to testing and repairing pumping systems

## Evidence Guide

### EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

#### Overview of assessment

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently:

- observe safety procedures and requirements
- communicate effectively with others involved in or affected by the work
- identify the application, purpose and operation of the pumping system
- select testing and repair methods and techniques appropriate to the circumstances
- complete preparatory activity in a systematic manner
- accurately interpret test results
- conduct testing and repairs in accordance with workplace and manufacturer/component supplier requirements
- follow correct handling and disposal procedures for chemical cleaning agents
- present repaired pumping system to customer in compliance with workplace requirements
- complete workplace records.

#### Context of, and specific resources for assessment

- The application of competency is to be assessed in the workplace or a simulated environment that reflects as far as possible the actual working environment.
- Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.
- Assessment is to comply with relevant regulatory requirements, including specified Australian standards.
- Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
- The following resources should be made available:
  - a range of pumping systems and components
  - materials relevant to testing and repair of pumping systems
  - equipment, hand and power tooling appropriate to



<b>EVIDENCE GUIDE</b>	
	testing and repair of pumping systems <ul style="list-style-type: none"> <li>• specifications and work instructions.</li> </ul>
<b>Method of assessment</b>	<ul style="list-style-type: none"> <li>• Assessment must satisfy the endorsed Assessment Guidelines of this Training Package.</li> <li>• Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of Required Skills and Knowledge.</li> <li>• Assessment methods must be by direct observation of tasks and include questioning on Required Skills and Knowledge to ensure its correct interpretation and application.</li> <li>• Assessment may be applied under project-related conditions (real or simulated) and require evidence of process.</li> <li>• Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.</li> <li>• Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.</li> </ul>
<b>Guidance information for assessment</b>	Assessment processes and techniques must be culturally sensitive and appropriate to the language and literacy capacity of the candidate and the work being performed.

## Range Statement

<b>RANGE STATEMENT</b>	
<p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.</p>	
<b>Pumping systems</b>	Pumping systems may include: <ul style="list-style-type: none"> <li>• centrifugal pumps as used for firefighting, irrigation and water transfer</li> <li>• high-pressure piston pumps as used in</li> </ul>

<b>RANGE STATEMENT</b>	
	pressure cleaners <ul style="list-style-type: none"> <li>• diaphragm pumps as used in orchard spraying</li> </ul>
<b>Pump system variables</b>	Pump system variables may include: <ul style="list-style-type: none"> <li>• heating devices as found in hot pressure washes</li> <li>• high-pressure low volume centrifugal</li> <li>• low-pressure high volume centrifugal</li> <li>• vane, rotor, piston and gear pumps</li> </ul>
<b>Servicing methods</b>	Servicing methods may include: <ul style="list-style-type: none"> <li>• on- and off-site testing and repair</li> <li>• isolation of faults, including internal and external leakage</li> <li>• dismantling, inspection and evaluation</li> <li>• replacement of components parts</li> <li>• assembly and completion of operational tests</li> <li>• adjustments</li> <li>• testing of unit for pressure, suction and discharge</li> <li>• communicating with customers</li> <li>• documenting and reporting on repairs and tests</li> </ul>
<b>Tooling and equipment</b>	Tooling and equipment may include: <ul style="list-style-type: none"> <li>• specific service/repair and general workshop equipment and tooling</li> <li>• pressure gauges</li> <li>• flow meters</li> <li>• cleaning equipment</li> </ul>
<b>Materials</b>	Materials may include: <ul style="list-style-type: none"> <li>• spare parts</li> <li>• lubricants</li> <li>• cleaning materials</li> </ul>
<b>Information/documents</b>	Information/documents may include: <ul style="list-style-type: none"> <li>• verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets (MSDS), diagrams or sketches</li> <li>• safe work procedures related to testing and repairing pumping systems</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• regulatory/legislative requirements pertaining to pumping systems</li> <li>• engineer's design specifications and instructions</li> <li>• organisation work specifications and requirements</li> <li>• instructions issued by authorised enterprise or external persons</li> <li>• Australian standards</li> </ul>
<b>WHS requirements</b>	<p>WHS requirements are to be in accordance with applicable commonwealth, state or territory legislation and regulations, and organisational safety policies and procedures, and may include:</p> <ul style="list-style-type: none"> <li>• personal protective equipment and clothing</li> <li>• safety equipment</li> <li>• first aid equipment</li> <li>• hazard and risk control</li> <li>• elimination of hazardous materials and substances</li> <li>• manual handling, including shifting, lifting and carrying</li> <li>• emergency procedures</li> </ul>
<b>Legislative requirements</b>	<p>Legislative requirements are to be in accordance with applicable commonwealth, state or territory legislation, regulations, certification requirements and codes of practice, and may include:</p> <ul style="list-style-type: none"> <li>• award and enterprise agreements</li> <li>• industrial relations</li> <li>• Australian standards</li> <li>• Australian Design Rules</li> <li>• confidentiality and privacy</li> <li>• WHS</li> <li>• the environment</li> <li>• equal opportunity</li> <li>• anti-discrimination</li> <li>• relevant industry codes of practice</li> <li>• duty of care</li> </ul>
<b>Environmental requirements</b>	<p>Environmental requirements may include:</p> <ul style="list-style-type: none"> <li>• waste management</li> <li>• pollution</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• noise</li> <li>• dust</li> <li>• clean-up management</li> </ul>
<b>Quality requirements</b>	Quality requirements may include: <ul style="list-style-type: none"> <li>• regulations, including Australian standards</li> <li>• internal organisational quality policies and procedures</li> <li>• enterprise operations and procedures</li> </ul>
<b>Organisational policies and procedures</b>	Organisational policies and procedures may include: <ul style="list-style-type: none"> <li>• quality policies and procedures, including Australian standards</li> <li>• WHS, sustainability, environment, equal opportunity and anti-discrimination</li> <li>• manufacturer specifications and industry codes of practice</li> <li>• safe work procedures</li> <li>• reporting and recording procedures</li> </ul>

## Unit Sector(s)

<b>Unit sector</b>	Outdoor Power Equipment
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## Co-requisite units

Not applicable.

## Competency field

<b>Competency field</b>	Technical
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