



Australian Government

Department of Education, Employment and Workplace Relations

AHCIRG310A Operate and maintain irrigation pumping systems

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This Unit covers the process of operating and maintaining irrigation pumping systems and defines the standard required to: maintain pumps and pumping equipment; operate an irrigation pumping system; monitor pumping operations; isolate the pumping system; carry out basic repairs and replacement of parts; and dispose of waste.

Application of the Unit

This Unit applies to skilled workers in the irrigation servicing, food and fibre production and amenity horticulture industries, and is likely to be carried out under routine supervision within enterprise guidelines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This Unit contains employability skills.

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. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to maintain pumps	1.1 Work requirements for the satisfactory completion of operations are obtained and interpreted 1.2 Site, manufacturer's and legislative requirements and procedures necessary to complete the allocated work are accessed and interpreted 1.3 Items and tools required for the safe, effective and efficient conduct of servicing and maintenance tasks are identified 1.4 Support required for the safe completion of the servicing and maintenance tasks are identified and arranged 1.5 Isolation and lock-out of all equipment necessary for the safe execution of tasks is carried out in accordance with site requirements and procedures
2 Carry out pump maintenance	2.1 Pumps are inspected and any faults reported in accordance with site and manufacturer's requirements and procedure 2.2 Maintenance tools and equipment are selected and used safely 2.3 Servicing and maintenance of pumps is carried out in accordance with the work requirements, manufacturer's current specifications and site requirement 2.4 Hazardous and emergency situations are recognised and responded to in accordance with legislative, site and manufacturer's requirements and procedures 2.5 Used oil, lubricant and other waste is disposed of in accordance with legislative and site requirements 2.6 Servicing and maintenance records are maintained in accordance with site requirements
3 Prepare the pumping system	3.1 Operation and function of pump and driver is checked by applying principles of operation and procedures 3.2 The operational area is checked to ensure that any potential hazards which may affect the operation of the equipment are removed 3.3 Pre-start-up checks are conducted on the pumping system to ensure valves are correctly sequenced and filters are clear before commencing pumping operations, and that all safety requirements are met
4 Start up and shutdown pumping system	4.1 Ancillary equipment is operated in accordance with procedures. 4.2 Pump is started up and shutdown in line with procedures 4.3 Emergency shutdown procedures are implemented when required
5 Operate and monitor pumping and ancillary	5.1 Flanges, gaskets and seals are checked and maintained within stated operational tolerances and to avoid any environmental damage

- systems
- 5.2 Pump pressures and flows are monitored for conformance
 - 5.3 Amperage testing equipment is used to monitor and identify variations in the operating conditions of the pumping systems/equipment
 - 5.4 Pumping systems/equipment performance and all components are monitored and regularly checked to identify any signs of excessive wear and diminution of performance
 - 5.5 Operational valves and valve assemblies are checked for possible leakages
 - 5.6 Filter systems are periodically checked and cleaned to remove any potential blockages or impurities entering the pumping system/equipment and causing it to cavitate or malfunction during operation
 - 5.7 Lubrication oil is inspected and sampled to check that operating levels are correct and to determine if any contamination has taken place which may affect the operational capacity of the pumping system/equipment
 - 5.8 Appropriate action is taken resulting from checks and monitoring
- 6 Shut down the pumping system
- 6.1 Injection equipment is shut down according to workplace procedures
 - 6.2 The pump is shut down according to workplace procedures
 - 6.3 Pumping equipment is cleaned according to workplace procedures
 - 6.4 Waste generated by both the pumping process and cleaning procedures is collected, treated, disposed of or recycled according to workplace procedures

Required Skills and Knowledge

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

Required skills include:

Ability to:

- inspect and clean pumps
- clear blockages
- lubricate pumps
- check and top-up fluids, including:
 - coolants
 - lubricants
 - hydraulic oils
- replace wear components, including pump seals, liners and impellers
- replace v belts
- tension fasteners and y-belts
- adjust pump settings
- set valves and check for wear and leakages
- monitor pressures and flows
- use amperage testing equipment
- check and clear or replace filters
- check oil quality and levels
- use literacy skills to read, interpret and follow organisational policies and procedures, follow sequenced written instructions, record information collected accurately and legibly, and select and apply procedures for a range of tasks
- use oral communication skills/language competence to fulfil the job role as specified by the organisation, including questioning techniques, active listening, clarifying information and consulting with supervisors as required
- use numeracy skills to estimate, calculate and record routine workplace measures
- use interpersonal skills to work with and relate to people from a range of cultural, social and religious backgrounds and with a range of physical and mental abilities.

Required knowledge includes:

Knowledge of:

- properties of water including pressure and flow rates
- types of pumps and application in irrigation
 - centrifugal
 - vertical turbine
 - submersible
 - propeller
- advantages and disadvantages of each pump type
- pumps suitable as booster and floating pumps

- basic principles of hydraulics (flow vs. pressure)
- discharge and flow rates
- pump components and their principles of operation
- automatic pump switches
 - timers
 - pressure switches
 - irrigation controllers
 - flow switches
- impellers, rotors, stators
- pump gauges and controls
- pump performance and fault finding
- types of valves
- opening and closing valves
- monitoring performance of valves
- priming and operating pumps
- servicing requirements
- workplace and equipment safety requirements.

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

The evidence required to demonstrate competency in this Unit must be relevant to workplace operations and satisfy holistically all of the requirements of the performance criteria and required skills and knowledge and include achievement of the following:

- maintain pumps and pumping equipment
- operate an irrigation pumping system
- monitor pumping operations
- isolate the pumping system
- carry out basic repairs and replacement of parts
- dispose of waste.

Context of and specific resources for assessment

Competency requires the application of work practices under work conditions. Selection and use of resources for some worksites may differ due to the regional or enterprise circumstances.

Range Statement

The range statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. 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.

<i>Maintenance</i> of pumps may include:	• replacing wear components, including pump seals, liners and impellers • replacing v-belts • tensioning fasteners and v-belts • adjust pump settings.
<i>Servicing</i> of pumps may include:	• inspection • cleaning • clearing blockages • greasing • check and top-up fluids, including: • coolants • lubricants • hydraulic oils.
<i>Hazardous and emergency situations</i> may include:	• confined spaces • working alone • personal injury • electrical • dust • noise • environmental • chemical • fire.
<i>Pumping systems</i> may include:	all types of pumps and components (including filters and valves) used to move water to or through an irrigation system.
<i>Ancillary equipment</i> may include:	any systems that are part of the irrigation system (such as computerised scheduling) or work with the irrigation system (such as fertigation).

Unit Sector(s)

Irrigation