



Australian Government

AHCIRG438 Select and manage pumping systems for irrigation

Release: 1

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Modification History

Release	Comments
Release 1	This version released with AHC Agriculture, Horticulture, Conservation and Land Management Training Package Version 4.0.

Application

This unit of competency describes the skills and knowledge required to identify irrigation system requirements, select pump and supervise installation, commissioning and testing of pump system, develop maintenance procedures and troubleshoot irrigation pumping systems.

High voltage electrical work must be carried out by a qualified electrician.

The unit applies to individuals who apply specialised skills and knowledge to the selection and management of irrigation pumping systems and have responsibility for the output of others. This includes applying and communicating non-routine technical solutions to predictable and unpredictable problems.

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

Pre-requisite Unit

Nil

Unit Sector

Irrigation (IRG)

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Identify irrigation system requirements from the irrigation design	1.1 Identify the components of the irrigation pumping system 1.2 Determine the water source and height of pull for water into the system 1.3 Determine the water output for irrigation

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.4 Calculate the total friction loss of irrigation components
2. Select pump according to type, installation, range of flow rates, operating head and delivery distance	2.1 Select pump type based on pumping task and placement and the power source 2.2 Calculate total operating head requirements 2.3 Calculate pump discharge requirements based on irrigation output requirements and friction losses in the system 2.4 Determine pump motor speed and power requirements 2.5 Determine pump limiting suction lift 2.6 Interpret pump performance curves when selecting an efficient irrigation pump 2.7 Determine the size of the impeller from the pump curve
3. Supervise installation of pumps	3.1 Ensure pump is level and sited as close as possible to water source 3.2 Verify pump is properly anchored and connections are airtight 3.3 Confirm pump and motor connection are correctly aligned and motor is ventilated 3.4 Verify filters and valves are correctly fitted and orientated 3.5 Check pump is connected to the irrigation controller if required
4. Oversee commissioning and testing of pumping system	4.1 Develop pre-start and start up procedures 4.2 Check delivery performance and verify power usage and water output against requirements and pump specifications 4.3 Ensure pumping system is checked for leakages and cavitation 4.4 Confirm pumping system is operating effectively
5. Develop maintenance procedures for the pumping system	5.1 Develop routine maintenance procedures to rectify the effects of normal wear 5.2 Develop periodic inspection checklists to assist in maintenance scheduling 5.3 Carry out pump overhaul or repairs 5.4 Keep pump maintenance records, including details of pump and pumping system components for ordering
6. Carry out troubleshooting on	6.1 Investigate lack of discharge or pressure and change settings or components

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
pumping systems	6.2 Investigate loss of water suction and make alterations to placement or fix leakages 6.3 Investigate cavitation in pumps and change settings or components 6.4 Investigate excessive power consumption and review design and pump selection and check for mechanical defects

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential for performance in this unit of competency but are not explicit in the performance criteria.

Skill	Description
Reading	Identify and interpret information regarding selecting and managing irrigation pumping systems
Numeracy	- Calculate water output, friction loss and operating head requirements - Identify and record pump system component numbers
Navigate the world of work	Identify and describe own workplace requirements, including safety requirements, associated with own role and area of responsibility

Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
AHCIRG438 Select and manage pumping systems for irrigation	AHCIRG410 Select and manage pumping systems for irrigation	Performance criteria clarified Foundation skills added Assessment requirements updated	Equivalent unit

Links

Companion Volumes, including Implementation Guides, are available at VETNet: -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=c6399549-9c62-4a5e-bf1a-524b2322cf72>

Assessment Requirements for AHCIRG438 Select and manage pumping systems for irrigation

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Performance Evidence

An individual demonstrating competency must satisfy all of the elements and performance criteria in this unit. There must be evidence that the individual has selected and managed an irrigation pumping system on at least one occasion and has:

- identified irrigation system requirements from the irrigation design
- selected pump according to type, installation, range of flow rates, operating head and delivery distance
- calculated pumping requirements and pressure loss due to irrigation components
- supervised installation of pumps
- monitored the performance of pumps, valves and filters
- developed maintenance procedures for the pumping system
- carried out troubleshooting on the pumping system.

Knowledge Evidence

An individual must be able to demonstrate the knowledge required to perform the tasks outlined in the elements and performance criteria of this unit. This includes knowledge of:

- application of mechanical, hydraulic and electrical principles
- automatic pump switches, including:
 - flow switches
 - irrigation controllers
 - pressure switches
 - timers
- sources of information and the processes for the calculation of material requirements and flow rates
- advantages and disadvantages of each pump type
- selection factors for pumps, including:
 - source of water and lift
 - the required pumping flow rate and pressure

- the total dynamic head
- the total suction head
- types of pumps and application in irrigation, including:
 - centrifugal
 - propeller
 - submersible
 - vertical turbine
- types of pumps suitable as booster and floating pumps
- discharge and flow rates
- types of impellers and their use
- environmental procedures for installing and maintaining irrigation pumping systems
- pump installation factors, including:
 - adequate space, head room, ventilation and lighting
 - correct alignment procedures of pump and motor shafts with direct coupled units
 - provision for adjustment and ease of dismantling
 - levelling and alignment processes
 - overhaul or repair operations
 - properties of water including pressure and flow rates
 - pump components and their principles of operation
 - pump efficiency, performance and pressure testing
 - pump positioning (driver alignment and suction length)
 - access for routine preventative maintenance
- types of valves
- pump cavitation, cause and effect.

Assessment Conditions

Assessment of skills must take place under the following conditions:

- physical conditions:
 - a workplace setting or an environment that accurately represents workplace conditions
- resources, equipment and materials:
 - irrigation pumping system equipment and tools
 - irrigation pumping system measuring, and recording equipment and procedures
- timeframes:
 - according to the job requirements.

Assessors of this must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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