



Install micro-irrigation systems

AHCIRG203A

By the end of this topic, you should be able to:

- Prepare tools and materials for installation work
- Set out and prepare site
- Install irrigation components
- Complete installation work

What is an irrigation system?

- An irrigation system is a system of components which supplies and distributes water
 - Water supplies may include: Underground, mains and surface storage
- Micro-irrigation systems include:
 - Low pressure micro-sprays
 - Drippers

What is an irrigation system?

- A pressurised irrigation system consists of many components, including:

Equipment	Definition
Drip tape	Water distribution system that operates at very low pressure.
Emitter	Two main types: Allow water to seep into the root zone or direct water into the air. Includes micro sprays.
Filter	Removes debris from systems.
Fittings	Used to join pipes together. Poly fittings have barbed ends which are pushed into the pipes to connect them together.
Gate valve	Used primarily as a shut-off valve, as opposed to flow control.
Master valve	Ensures that at the end of the watering cycle the water is turned off at a central valve.
Pipe	Provides an outlet for water to travel through.
Pump	Deliver waters to irrigation system. Ensures consistent water delivery.

Setting up irrigation components

- When setting up irrigation components, you should familiarise yourself with the following:
 - Task requirements
 - The irrigation plan will determine the scope and requirements of an irrigation job, including:
 - Site location
 - Types and amounts of irrigation equipment required
 - Where existing plans and underground services are located
 - Speak to your supervisor
 - Apply active listening when receiving instructions
 - Clarify any unclear instructions with your supervisor

Setting up irrigation components

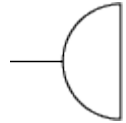
- Some common symbols that may be found on an irrigation plan:



Direction of water flow



Filter



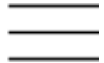
Flushing valve



Gate valve



Micro sprayer



Water source

Setting up irrigation components

- When setting up irrigation components, you should familiarise yourself with the following:
 - Workplace information
 - Abide by laws applicable to your workplace, such as:
 - Acts [e.g. *Work Health and Safety Act 2011 (Qld)*]
 - Regulations [e.g. *Work Health and Safety Regulation 2011 (Qld)*]
 - Consider local community requirements (e.g. water restrictions)

- When setting up irrigation components, you should familiarise yourself with the following:
 - **Work area**
 - Identify any WHS hazards and assess risks (e.g. manual handling injuries)
 - Identify environmental impacts (e.g. waterlogging, soil salination, ecological damage)
 - Report hazards to your supervisor within a timely fashion – especially emergency situations

- When setting up irrigation components, you should familiarise yourself with the following:
 - Available PPE, tools and equipment
 - PPE may include: Gloves, goggles, gumboots, long sleeved shirt, long trousers, waders, wide brimmed hat, work boots
 - Safety equipment may include: Signage and barricades (e.g. safety cones, flagging tape/nets)
 - Machinery, tools and equipment may include: Broom, hammer, marking paint, mechanical trenching machine, pipe cutter, poly clips, rake, rubber mallet, saw, spade, screwdriver, standard shovel, tape measure, trenching shovel, trowel, wire strippers
 - Ensure they are appropriately selected, prepared and used for the task, following manufacturer recommendations and enterprise work procedures

Organising resources

- Materials, tools, equipment and machinery are selected according to the irrigation system design requirements
 - When parts and equipment are delivered to site, they should be checked according to the system drawings and specifications
- Check the water supply and ensure it is compatible with the specifications of the system
 - Determine the flow rate before installing irrigation to establish how many sprinklers you can install and what size pipes you should use

Flow rate is the rate at which water flows from a water source
→ $[\text{Quantity (Litres)} \times 60] \div \text{Time (seconds)}$
= Number of litres/minute (flow rate)

- Be sure to check water quality, as this will affect the irrigation system
 - Two issues you may encounter with water quality include:
 - Chemical: Acidic, alkaline, concentrations of certain elements
 - Physical: Algae growth
- Water filtration techniques may be implemented, such as:
 - Disk filters
 - Cartridge filters
 - Centrifugal filters
 - Media filters
 - Screen filters

- When undertaking irrigation tasks, you will likely be working as part of a team (e.g. co-workers, contractors, consultants)
- Observe the following tips regarding teamwork:
 - Use clear language and concepts (verbal and non-verbal)
 - Consider the varying cultural and ethnic backgrounds of your co-workers
 - Consider the message you are communicating and the best method to communicate it (e.g. written, verbal)
 - Consider the abilities of your co-workers
 - Observe contractors' work to ensure they understand requirements

Assembling an irrigation system

- To assemble an irrigation system, undertake the following steps:
 - Mark and excavate trenches to the required depth
 - Mark excavation lines with marker paint and chalk
 - Avoid damage to features and established plants
 - Place pipes into position and cut to required lengths
 - Connect fittings to the pipes

Ensure that you keep a clean workspace throughout the installation

Checking irrigation system

- It is essential to check an irrigation system after installation
 - Check the system configuration and capacity matches the installation plan
 - Check the overall system for any missed joints and incomplete installation
 - Ensure joints are properly sealed using poly clips
 - Check that all pipe work is at the same level to ensure efficiency
 - Elevation, slope and orientation of terrain all affect the direction of water flow
 - Flush the system
 - Force water through the irrigation system using a hose in order to clean out the silt and test each lateral

Testing and monitoring equipment must be calibrated

Checking irrigation system

- To test an irrigation system, undertake the following steps:
 - Open the furthestmost solenoid valve
 - Open the main valve
 - Allow the system to run until the water is clear
 - Turn off the furthestmost solenoid
 - Check for leaks along the mainline, especially around control valves
 - Leave joints exposed until pressure tested
 - Turn off main valve
 - Turn on each station individually using the controller

Follow the start-up sequence specified in the operations manual

Checking irrigation system

- You may encounter a range of issues when testing an irrigation system, such as:
 - No water
 - Check that the main water valve is turned on
 - There may be debris clogging the system (e.g. at valve, sprinkler, or filters)
 - Water leaks
 - Pipes may be broken, cracked or damaged
 - There may be debris clogging the system (e.g. at valve, sprinkler, or filters)

Take corrective actions according to the operation's manual

- As part of completion processes, you should:
 - Finish off earthworks and restore site
 - Maintain, clean and store tools and equipment according to manufacturer's specifications
 - Report faults that are discovered
 - Store tools in a dry, sheltered environment
 - Place tools in racks for easy location and safety
 - Store similar tools together for easy access
 - Dispose of materials that cannot be reused or recycled
 - Ensure you implement environmentally safe practices
 - Follow SDS requirements
 - Record and report work outcomes to your supervisor

- Some tips for using an irrigation system:
 - You should monitor irrigation times to deliver sufficient volume without overwatering
 - You may be required to regulate an irrigation system more than once to maintain correct operating pressure and water flow
 - If similar components in a system are starting to break down, you should consider replacing them all rather than repairing them
 - Note that water molecules hold more tightly to the fine particles of a clay soil than to coarser particles of a sandy soil, so clays generally retain more water
 - Soil water content can be measured using a known volume of the material and a drying oven
 - Geophysical sensors are often used to monitor soil moisture continuously in agricultural and scientific applications