

1. Module details

Module name **Potable Water Distribution System (Reticulation)**

Module duration It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 - 40 hours.

Module code NUE020

Discipline code 0702130

2. Module purpose

This module will provide the learner with the skills required to operate and perform minor repairs and maintenance to the community's potable water distribution (reticulation) system.

3. Prerequisites

Nil.

4. Relationship to competency standards

This module provides part of the underpinning knowledge and skills in the 'Evidence Guide' of specific units of competency in the National Electrotechnology Training Package and provides similar support, where mapped, to equivalent units in the National Metals and Engineering Competency Standards. For details refer to the module to unit maps, available from NUEITAB.

5. Content**Valve operation**

Types of valves
Location
Identification
Isolation operations
Make safe procedures
Maintenance
Safety awareness

Fault conditions

Location
Identification
Notification
Make safe protection
Rectification
Safety awareness

Corrosion control

Identification
Descaling
Repair as necessary
Prevention procedures
Reporting procedures
Safety awareness

Leaking pipes

- Location
- Identification
- Repairing of the leak/s
- Area protection
- Isolation
- Excavation (if necessary)
- Emergency repairs
- Safety awareness

Water meters

- Identification and location
- Reading and recording
- Fault identification
- Isolation of the system
- Changing a faulty meter
- Notification
- Safety awareness

6. Assessment strategy

Assessment methods

Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving.

Conditions of assessment

Learning and assessment will take place in an environment that is conducive to a learner's development.

7. Learning outcome details

Learning outcome 1

Locate, identify and operate the valves, which control the water distribution system in a safe, efficient manner.

Assessment criteria

- 1.1 Identify the various types of water control valves used within the water distribution system.
- 1.2 Interpret water reticulation plans/drawings.
- 1.3 Describe the operation of the different types of water control valves.
- 1.4 Identify the distribution systems and the valves which control them, eg water meters, hydrants, markers, valve boxes and scour points.
- 1.5 Demonstrate the isolation methods used when repairs or maintenance are necessary.
- 1.6 Demonstrate the make safe procedures used in the event that work on the system or part of the system is required.
- 1.7 Operate the control valves for service of the system as directed using the correct procedures.
- 1.8 Perform maintenance procedures on the control valves as directed.
- 1.9 Perform emergency repairs to the distribution system as directed.
- 1.10 Observe all safety procedures including the wearing of personal protective equipment.

Note Disinfectant procedures must be carried out after pipeline repairs/work in order to prevent contamination.

Learning outcome 2

Locate, identify and repair fault conditions that may develop within the water distribution system.

Assessment criteria

- 2.1 Identify that a fault exists within the distribution system.
- 2.2 Identify the type and seriousness of the fault.
- 2.3 Describe the purpose of mains flushing and explain how it is performed.
- 2.4 Record the fault and notify the appropriate person(s).
- 2.5 Isolate the fault and apply any make safe devices that would be necessary.
- 2.6 Repair the fault.
- Note* *If the fault is of a serious nature notify the appropriate person(s) to arrange for the repair to be carried out.*
- 2.7 Observe all safety procedures including the wearing of personal protective equipment.

Learning outcome 3

Identify and safely apply corrosion control substances to the water distribution equipment.

Assessment criteria

- 3.1 Demonstrate the most appropriate method of descaling and cleaning the water distribution equipment.
- 3.2 Perform minor repairs to the water distribution equipment after descaling and cleaning procedures have been carried out.
- 3.3 Demonstrate the correct protection preparation methods necessary before repainting the water distribution systems.
- 3.4 List the correct undercoat application and thinning agent as recommended by the manufacturer for painting the equipment outlined in section 3.1.

Learning outcome 4

Perform necessary repairs to damaged or leaking water pipes including emergency repairs in a safe and efficient manner.

Assessment criteria

- 4.1 Identify that a fault exists from the possible symptoms surrounding the fault, eg, above ground or below ground.
- 4.2 Notify the appropriate person(s) that a fault exists and the water will be turned off to facilitate repairs.
- 4.3 Locate the pipe in which the fault condition exists.
Above ground repair (Steps 4.1 through to 4.3 would also apply to above ground)
- 4.4 Isolate the section of the system which supplies the pipe in which the fault exists and apply make safe devices.
- 4.5 Re-valve the water main to isolate the damaged area in order to maintain the water supply to as many consumers as possible.
- 4.6 Perform the necessary repairs to the pipe. The method in which the repair is carried out will depend on the type of pipe being used eg:
 - Galvanised pipe
 - High Density Polyethylene (HDPE)
- 4.7 Remove the make safe devices, reactivate the repaired system and check for leaks.
Underground repair (Steps 4.1 through to 4.3 would also apply to underground)
- 4.8 Isolate the section of the system which supplies the pipe in which the fault exists and apply make safe devices.
- 4.9 Re-valve the water main to isolate the damaged area in order to maintain the water supply to as many consumers as possible.
- 4.10 Erect safety barriers around the site which is to be excavated and affix the appropriate safety signage.
- 4.11 Excavate the ground covering the pipe until the damaged section of pipe is exposed.

- 4.12 Excavate the area either side of the damaged section and below it (if possible) to allow sufficient room to repair the pipe.
- 4.13 Erect appropriate trench shoring and provide adequate means of access, egress and ventilation.
- Note Do not run petrol powered equipment in or near trench excavations*
- 4.14 Perform the necessary repairs to the pipe.
- 4.15 Remove the make safe devices, reactivate the system and check for any water leaks (if there are no leaks proceed with the task).
- 4.16 Cover the exposed pipe with clean fill sand and remove trench shoring.
- 4.17 Fill in the excavation, pack down and replant any vegetation that may have been removed.
- 4.18 Remove and store away the safety protection barricade.
- 4.19 Perform emergency repairs to the water distribution system when necessary as directed.
- 4.20 Observe all safety procedures including the wearing of personal protective equipment.

Learning outcome 5

Read and record the information displayed on the water distribution system's meters and perform minor maintenance.

Assessment criteria

- 5.1 Read and record the consumers water meters details.
- 5.2 Provide the appropriate person(s) with the information gathered from the water meters.
- 5.3 Observe the water meter and check for any faults, eg, water leaks, damaged pipes, meter inoperative.
- 5.4 Notify the appropriate person(s) of any fault condition that may exist.
- 5.5 Notify the person(s) concerned that the water will be turned off and for what reason.
- 5.6 Isolate the section of the system which supplies the water meter and apply make safe devices.
- 5.7 Disconnect the inoperative meter and cover the pipe ends to prevent the entry of foreign matter.
- Note The meter must be disconnected using the correct tools to prevent the pipes becoming twisted and damaged.*
- 5.8 Remove the pipe coverings and apply thread tape to the pipe fittings.
- 5.9 Connect the new water meter into the system and carefully tighten the pipe fittings (make sure the meter is fitted in accordance with the water flow).
- 5.10 Remove the make safe devices and turn the water on, observe the meter and fittings for any water leaks.
- 5.11 Crimp a new lead tamper protection seal to the water meter.
- 5.12 Record the water meters reading and forward it to the appropriate person(s).
- 5.13 Restore the area to its original condition and store away all tools and equipment in a safe and tidy manner.
- 5.14 Observe all safety procedures including the wearing of personal protective equipment.

8. Delivery of the module

Delivery strategy

Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module purpose. It is considered that the most effective method to achieve this is by integration of theory and practice where students learn by experimentation, research and reports. It is recommended that learning and assessment be facilitated in a holistic manner that may require learning outcome sequence other than that indicated in the module.

Resource requirements

Students will need access to an operational powerhouse to gain maximum benefit from this module. They will also need access to all service manuals for the equipment they are undertaking training.

Occupational health and safety requirements

A safe and healthy environment will be provided for students and teachers as well as the particular safety procedures followed as part of the learning / teaching activity and content.