

# JOB ROLE: MICRO-IRRIGATION TECHNICIAN

Sector – Agriculture  
(Qualification Pack Code : AGR/Q1002)



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# UNIT 3: OPERATION AND MAINTENANCE OF MICRO IRRIGATION SYSTEM

## Session 3: Maintenance of Drip Irrigation System

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# Session Objectives

The students will be able to:

- Describe the procedure of system flushing for the maintenance of a micro-irrigation system; and
- Demonstrate the procedure of cleaning filters.

# Introduction

A drip irrigation system is vulnerable to over-pressurisation and clogging, both of which can drastically reduce the system's durability and performance. A maintenance plan and regular monitoring of the system ensures that minor problems do not turn into major ones. In 'preventive maintenance', a procedure or group of procedures is adopted to prevent obstructions from plugging, clogging or blocking of drippers. In 'corrective maintenance', obstructions that cause dysfunction to the system are removed.

# System Flushing in Micro-irrigation System

System flushing is the process of opening flush valves on the main line, sub-mains or laterals while under pressure.

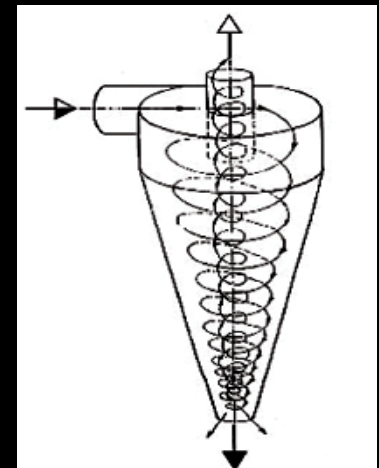
Flushing increases the water velocity inside the pipeline or dripper line, which scours and removes contaminants off the walls or from individual emitters. The pressure of the regulating valve is increased to achieve enhanced velocities, nevertheless, care must be taken not to exceed the burst pressure of the emitter line and take-off adapters. Recommended flushing velocities are as follows. (i) Main line: 1 metre per second (ii) Sub-mains: 1 metre per second (iii) Laterals: 0.5 metre per second

# Flushing Intervals

Quality	Water Source	Flushing Interval
Good	Bore water with no presence of iron or magnesium	6 month
Average	Rivers, dams or lagoons that are slow flowing Wastewater discharged from industries after treatment	4 Month
poor	Rivers, creeks or canals found in hot climates with increased biological growth and no chemical treatment Faulty placement of the pumping point in the direction of wind with little or no sedimentation Untreated effluent water after sedimentation	Monthly
Very poor	Bore water having high iron or magnesium content	Fortnightly

# Types of Filters and their Maintenance

**Hydrocyclone Filter:** Water enters the hydrocyclone via a tangential inlet, which creates a spiral flow along the walls of the filter. The centrifugal force separates the waste and sand particles and pushes them towards the walls of the sand separator. Particles gravitate downwards into the sedimentation tank, while clean water moves upwards and exits through the top outlet. The filter becomes ineffective once the dirt collection chamber is full. A hydrocyclone filter requires least maintenance as regards to cleaning. For cleaning, flush the chamber by opening the flush valve or cap or open the main valve.

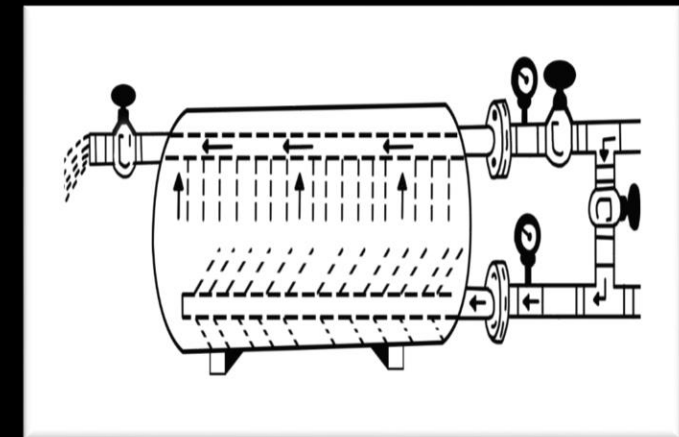




# Types of Filters and their Maintenance

**Sand Filter:** It helps remove heavy organic and inorganic pollutants. Over a period, contaminants present in the water accumulate and clog the pore space of the sand bed, thereby, reducing filter efficiency.

The sand filter must also be cleaned regularly in the following manner: (i) Open the lid of the sand filter, (ii) Start the backflush operation, (iii) Put one hand inside the sand filter and stir the sand thoroughly, (iv) Allow all water along with dirt to flow through the main hole of the sand filter, and (v) Close the lid for normal operation.



# Types of Filters and their Maintenance

**Screen Filter:** It removes sand from water. Flushing at scheduled intervals is necessary for the maintenance of screen filters. It is recommended to flush the screen filter when the pressure drops more than  $0.5 \text{ kg/cm}^2$  (5 m at water head). The pressure difference can be observed by checking the inlet and outlet pressure by using a single three-way control valve at regular intervals.

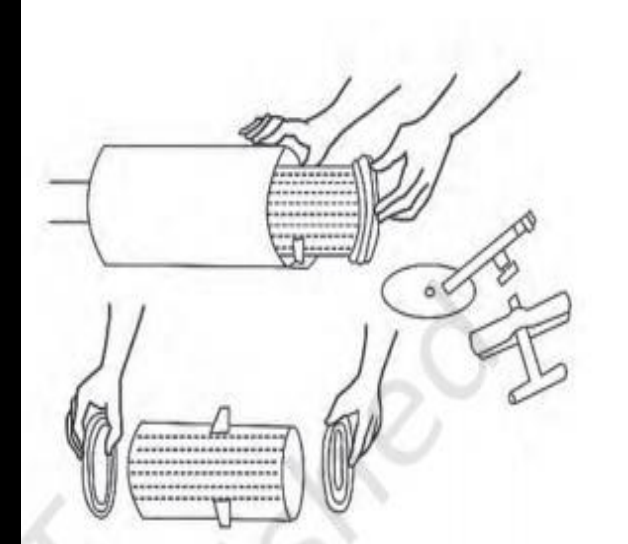


# Types of Filters and their Maintenance

**Screen Filter:** The process of cleaning the screen filter is simple.

Flushing of a screen filter is done in the following manner.

- (i) Open the drain valve, thereby, allowing the water force to flush out dirt through the valve.
- (ii) Open the screen filter lid. Remove the screen and clean it under running water by rubbing it with a cloth or soft nylon brush.
- (iii) Protect the metal parts of the filter from scratches, acid, chlorine or fertiliser spillage, and apply oil paint immediately on the scratch to avoid corrosion.



# Types of Filters and their Maintenance

**Disc Filter:** A disc filter serves as a primary or secondary filter for water, which contains high amount of organic or inorganic matter. It consists of a stack of discs, each with a series of microscopic grooves. The dimension of the grooves determines the effective mesh size of the filter, which generally, ranges from 40 to 600 mesh. Disc filter requires less maintenance.



# Types of Filters and their Maintenance

**Disc Filter:** Flushing of the disc filter is done either by opening the drain valve or by back flushing. The steps followed for cleaning the disc filter are as follows. Step 1: Remove the filter element and loosen the disc set by extending the spine element. Step 2: Now, remove the screen and clean it with pressurised clean water. Step 3: Replace the worn out discs with clean ones. Step 4: If the disc filter is to be cleaned with an acid or a chlorine solution, use the recommended concentration. Step 5: Assemble the filter after cleaning.



# Summary

In this session, you have learnt about the procedure of system flushing for the maintenance of a micro-irrigation irrigation system. You have also learnt about the various types of filters and the procedure of cleaning them.

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