



Agricultural Drip and Micro Irrigation Systems Maintenance – Version 1.1

Introduction

The most common problem facing Drip and Micro Irrigation systems is clogging of the emitters. This can be caused by a build up of sediments, silts, inorganic and organic matter which can partially or fully clog emitters. Maintenance of drip and micro irrigation systems is required for them to continue to provide trouble free service, and a number of strategies can be employed to resist system clogging.

System Filtration

It is important for Drip and Micro Systems to have adequate filtration systems providing filtered water to the system. There are various types of filtration devices available on the market generally being Screen, Disc or Media Filtration. Drip systems are ideally filtered to about 200 Mesh (76 Micron) and Micro sprays and Mini sprinklers to about 120 Mesh (120 Micron).

Physical Treatments

The filtration system must be inspected and cleaned or back-flushed regularly. A clean filter will give a lower pressure drop across the filter, reducing pumping costs and maintaining correct downstream system operating pressure. The system if correctly designed shall have flushing points at the ends of submains and laterals. These points shall be opened periodically to flush out any accumulated sediments from the lines.

Chemical Treatments

Chlorination

The system can be chemically treated with a chlorine solution to kill algae and bacteria that can build up inside irrigation lines. After an irrigation cycle, water remains inside irrigation lines providing a suitable environment for bacteria and algae to grow. This can cause fine clay particles to stick together or create reactions that convert soluble ions to insoluble ions and block emitters when the next irrigation cycle starts. Chlorination will reduce the build up of algae and bacteria. There are three common types of chlorination treatments that can be employed being:

- **Continuous** – (where clogging is a continual problem) – 1-2 ppm continuously.
- **Intermittent** – (for intermediate treatment) – 5 – 20 ppm for 30 – 60 minutes say once per month, leave for 3 to 4 hours then flush thoroughly.
- **Superchlorination** – 200 – 500 ppm if the system is fully clogged. The system shall be filled and left overnight (shut down) and then thoroughly flushed the next day. Care must be taken with this method as it can damage the crop. This may need to be repeated if the system is really clogged.

Formula

$$\text{Injection Rate} = \frac{K \times \text{PPM} \times Q}{\% \text{OCL}}$$

Where:

K = 0.36 (metric) or 0.006 (US)

PPM = Desired Parts per million of free chlorine

Q = System Flow Rate (L/s – metric) (GPM – US)

%OCL = percentage concentration of hypochlorite solution being injected



Acid Injection

In some areas, the irrigation source may be referred to as 'hard' water, for example where water contains a large amount of dissolved calcium or magnesium carbonate. This can precipitate out of the water and build up into calcium or other alkaline deposits. These hard deposits can gradually reduce the size of internal flow passages of drippers. These alkaline precipitates can be easily identified by putting a drop of Hydrochloric acid on some precipitate on the outlet of a dripper, and if it fizzes it is a carbonate.

Treatment is by injecting Hydrochloric Acid, lowering the pH to 4 or less for 30 to 60 minutes, leaving for 1 to 2 hours and then flushing the system thoroughly.

REMEMBER : Always add Acid to Water. Always check for correct dilution rates. Incorrectly concentrated acidic solutions may cause permanent damage to your irrigation system. Take extreme care when handling undiluted acids as they are highly corrosive and toxic, including fumes.

Notes

Ensure local health/safety operations are followed for handling of chemicals and equipment.

Good basic reference site -

<http://agriculture.vic.gov.au/agriculture/horticulture/vegetables/vegetable-growing-and-management/maintenance-of-micro-irrigation-systems>