



Water for Profit

ACID TREATMENTS FOR MICRO-IRRIGATION SYSTEMS



WATERFORPROFIT

Satisfactory filtration and pre-treatment of micro-systems are two major functions which ensure peak system performance and longevity.

Introduction

Deposits can be prevented by applying chlorine and acid during irrigation, and/or opening the line ends to allow water to flush straight through.

Adjustment of pH

Water containing large amounts of calcium carbonate (hard water) or more than 1 mg/L of iron should be acidified to a pH of 5.5 to 6.5. This will keep the potential precipitates in solution and prevent the subsequent blockage of emitters.

Inject the acid continuously in a similar fashion to chlorine, but downstream of the filter. Only use acid-resistant components in the injection system, and always install a check valve (non-return valve) to prevent backflow into the acid tank.

Alternatively, inject sufficient acid to lower the pH to 4 or less for 30 to 50 minutes before the end of the irrigation cycle. Leave the acid in the lines for at least 24 hours and flush the system thoroughly before starting the next irrigation.

Determine the concentration of acid needed to lower the pH to a desired value by adding concentrated acid to a 200 litre drum of the irrigation water until the desired pH is reached.

Example: to lower the pH to 4.0 for the removal of deposits within the system described in the previous example:

The pump rate is 10 L/s and the concentration of acid required is 20 mL/200L, that is, 0.01 per cent. The injection rate of concentrated acid = $10 \times 3,600$ multiplied by 0.01 divided by 100 = 3.6 L/h.

To inject acid at this concentration for 60 minutes, the volume of concentrated acid = 3.6 multiplied by 1 = 3.6 litres.

If the injection pump has a rate of 100 litres/hour, add acid to the holding tank at the rate of 3.6 litres per 100 litres.

For a 200 litre tank, the acid charge = 3.6 multiplied by 200 divided by 100 = 7.2 litres.

To remove carbonate scale from irrigation lines and emitters, use a slug of acid in a similar fashion to the slug dosing of chlorine for the removal of organic slimes. Inject sufficient acid to lower the pH to 2.0 and shut down the system, leaving the acid in the lines for at least 24 hours. Then thoroughly flush the system before starting the next irrigation cycle.

Warning: the acids commonly used - hydrochloric and sulphuric - are highly corrosive and toxic in the concentrated form. Take utmost care in handling them. In the case of hydrochloric acid, care should be taken to avoid breathing the fumes. When diluting concentrated acids, always add acid to water, never water to acid.

Table 1: injection treatments for micro-irrigation

Source	Nature of problem	Treatment
Biological	Algae	Chlorination
	Red iron sludge	Chlorination
	Any organic material	Chlorination
	Slimy bacteria	Chlorination
	Iron or manganese bacteria	Chlorination
Chemical	Iron or manganese sulphides	Acid injection
	Calcium or magnesium carbonate precipitation	Acid injection
	Any inorganic material	Acid injection
Physical	Root intrusion	Herbicide injection

Best practice information has been obtained from Agriculture WA, Hardie Micro-irrigation Design Manual by Michael J Boswell, Fertigation by C.Burt, K O'Connor and T Ruehr and the Netafim Australia Drip Irrigation Maintenance Manual and are gratefully acknowledged.

For more details contact Growcom on 07 3620 3844.

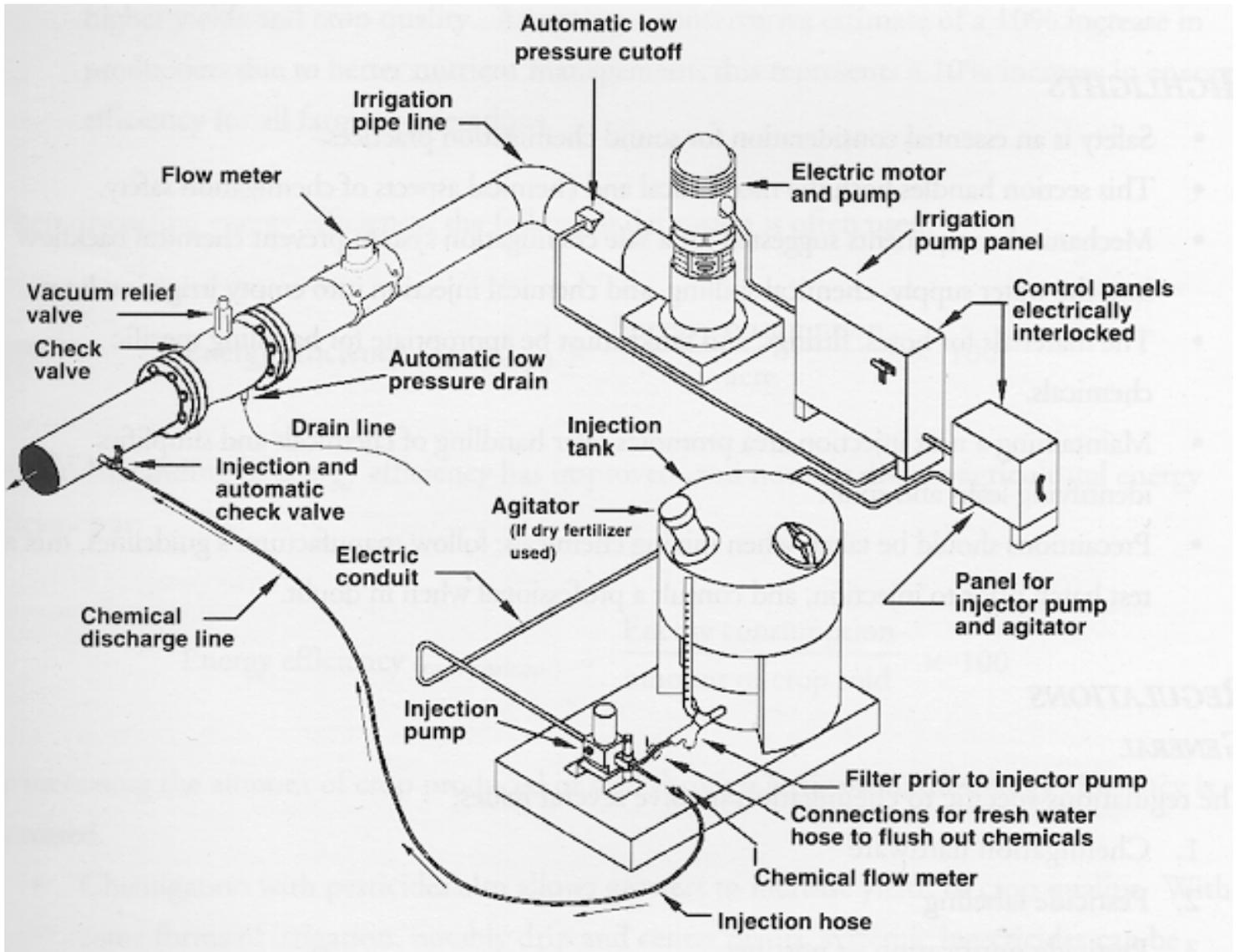


Figure 1: typical injector configuration

Disclaimer: This information is provided as a reference tool only. Seek professional advice for irrigation specifics.

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