



Chemigation & Fertigation for Groundwater and Surface Water Quality

What is Chemigation and Fertigation?

Chemigation and Fertigation are very similar processes. Chemigation involves the release of chemicals such as herbicides, insecticides and fungicides into irrigation and water reticulation systems to help keep weeds and pests at bay. Fertigation is the application of plant nutrients, fertilisers, soil improvers and soluble fertilisers through an irrigation system.

How do These Systems Operate?

Injectors are used to apply the desired substances into irrigation lines for distribution on crops. There are two main types of injectors used to put chemicals or nutrients into systems; the Venturi Injector and the Reciprocating Pump Injection.

The Venturi Injector is a device which creates a vacuum when water flows through it and the vacuum from the venturi sucks fertiliser or chemical into the irrigation line.

The Reciprocating Pump Injection is used to pump fertiliser and chemicals from feed tanks into the irrigation line. Injectors of this type use either a stroking piston or flexing diaphragm in combination with check valves to inject a pulsating stream of liquid.

There are two main methods to inject fertilisers and chemicals into irrigation lines. Some systems are powered through an external power source (usually electricity or engine powered), allowing the injector to run without reducing flow or pressure in the irrigation line.

Some injectors are water driven, meaning they are driven by the flow or pressure of the main irrigation pipeline. Most venturi and reciprocating pump injections systems are water driven.

How do these systems interfere with water quality?

Systems of this nature directly linked to a water source such as a river or billabong have the ability, if not constructed or maintained properly, to directly contaminate surface water supplies through the backflow, injection or siphonage of fertilisers and chemicals through the main irrigation lines into the surface water system. Backflow occurs when hydraulic conditions within the system may deviate from 'normal' conditions causing water to flow in the opposite direction. Injection occurs when there is a failure of one or more of the barriers put in place as part of the operating system. Back siphonage is caused by mainline pumping failures or drafting due to high demands placed on the system or faulty pumps.

In the NT, pollution of groundwater and surface water is an offence under both the *Water Act 1992* and the *Waste Management and Pollution Control Act 1998* and can incur a fine ranging from \$25,000 for an individual and \$250,000 for corporations. It is important that if you are aware of actual or potential contamination to groundwater or surface water supplies in your area that you report it to your nearest regional branch. Contamination

may not only affect the quality of your drinking water but your neighbours as well.

How can we ensure that we are not contaminating our water supplies?

In the tropics, it is common that non-return valves and solenoid valves are subject to failure and are not always 100 per cent efficient. Therefore it is recommended that when installing a system of this nature that systems should be designed with an air break between the surface water source (i.e. river or billabong) and the source of chemical/fertiliser and not directly injected into water lines. An effective example of such a system may incorporate a mixing or holding tank for chemicals/fertilisers that is connected to a supplementary line into your irrigation system and not directly linked to the main irrigation line from the river, dam or billabong and must be installed to Australian Standard AS3500.

There are also other of ways of ensuring backflow does not occur in your system by installing and maintaining backflow prevention devices. There are a range of backflow valves available and it is important that you choose the right type and amount of check valves for your Fertigation system. Backflow prevention devices such as double check valves must be installed and maintained by a certified backflow prevention plumber. Audits of valves must be undertaken yearly. You are also required by law to seek advice and assistance when installing or replacing systems of this nature by a certified plumber or system retailer.

It is vital that Chemigation or Fertigation systems and the storage of associated chemicals and fertilisers are at least given a 100m radius separation distance from your bore head. It is also a licensing requirement that all systems are approved by the Controller of Water prior to installation. Installation standards can be obtained from the Department.

Further Information:

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