

Chemigation

<http://www.ag.ndsu.edu/extension-aben/irrigation/chemigation>

Chemigation is the injection any chemical such as nitrogen, phosphorus or a pesticide into irrigation water and applied to the land using the irrigation system. The proper use of chemigation is recognized as a Best Management Practice (BMP) for irrigated agriculture. However, in order to use chemigation to benefit your crop production, you have to understand the equipment and management requirements and limitations.

Chemigation in North Dakota is used almost exclusively on center pivot sprinkler irrigation systems. Chemigation is not recommended for use with volume guns (big guns) due to poor application uniformity and wind drift problems. Chemigation can be used with other forms of sprinkler irrigation systems such as wheel rolls; solid set, towline and hand move.

The equipment requirements for protection of the water source when chemigating have been incorporated into the North Dakota Century Code. The law specifically requires the following equipment:

1. An anti-siphon device on the main water line
2. A backflow device in the chemical line
3. A pressure sensor on the pressurized water line
4. An inspection port (to check the operation of the check valve)
5. An injection port downstream from the anti-siphon device
6. A chemical resistant injection pump
7. Interlock between the water pump and the injection pump.

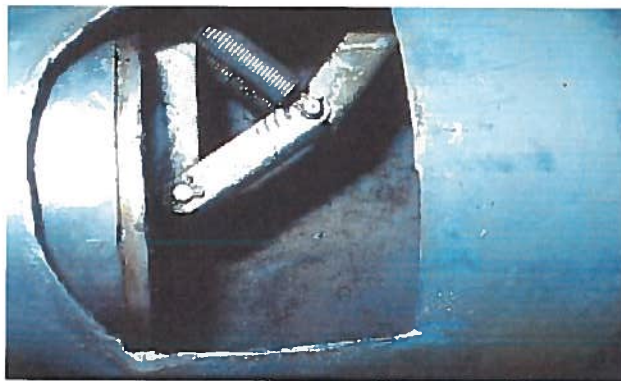
Chemigation Equipment



The most common anti-siphon device used with irrigation is a Chemigation Check Valve. Several manufacturers make these valves and they can be purchased from agricultural irrigation dealers. Most manufacturers make 4, 6, 8, 10 and 12 inch diameter models.



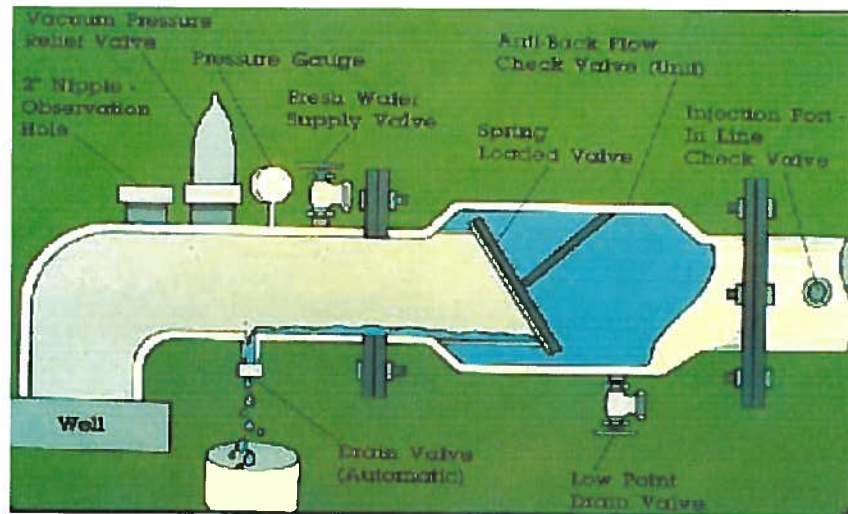
Chemigation check valve. The 2 bolts on top show the location of the spring operated flapper. Note the 4 inch inspection port with the air release valve on top and the injection port downstream from the flapper location.



Chemigation check valve cut away of the spring operated, positive pressure closing flapper.



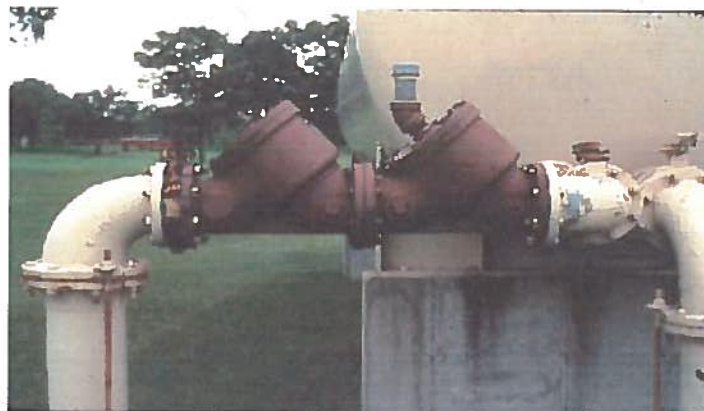
Four inch diameter inspection port allows you to see if the check valve is working when the water pump is off. Below the 4 inch opening you can also see the low pressure drain.



How the chemigation check valve and other connections protect the water supply (well).



Typical chemigation check valve installation. In the foreground is a diesel fuel tank. The nitrogen and pesticide tanks are behind the chemigation check valve.



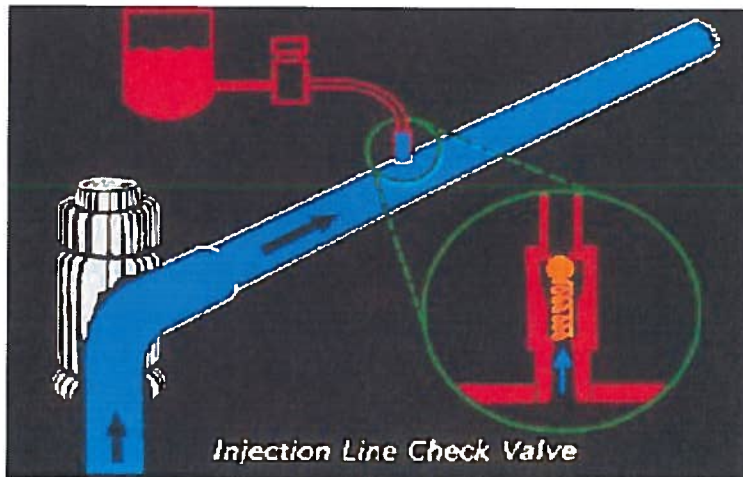
A double check valve used to protect a golf course irrigation system. Can also be used with center pivot systems but are much more expensive than chemigation check valves.



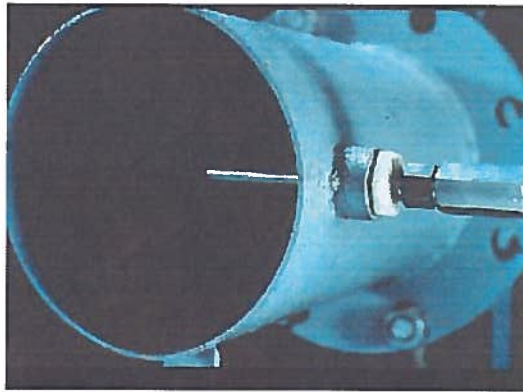
Chemigation check valve next to the well. Note the rubber hose connected to the low pressure drain directs leaking water away from the well.



Typical modular chemical injection equipment. Note the calibration tube on side of tank and the mixing motor on top of tank.



Drawing showing location of the chemical line check valve and injection point. This check valve should require at least 10 psi to open.



The chemical injector should extend to the middle of the pipe to ensure good mixing.



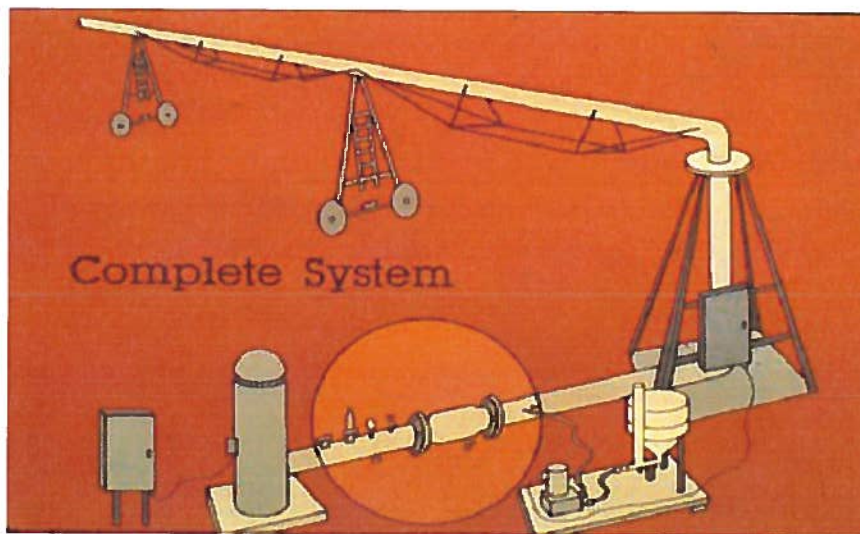
Pressure sensor on the riser pipe of a center pivot. If a low pressure situation occurs, the well pump, chemigation pump and pivot should shut down.



Mechanical interlock shuts off the chemical injection pump when the water pump stops.
Note the drive belt around the drive shaft of the water pump.



Electric outlet for the chemical pump is wired to the main line of the well pump, the pivot and provides an electrical interlock.



Drawing of how the complete chemigation system should look to protect the water source.

Chemigation Management



Don't chemigate when the wind speed is greater than 10 miles per hour. Pesticides and nitrogen drift with the water and can cause problems for neighbors.



Set your endgun so it won't spray on a maintained road. It is a violation of North Dakota law to spray water from an irrigation system onto a maintained road, whether chemigating or not.



To inject a pesticide into an irrigation system, it must say on the container label that it can be used for chemigation with the type of irrigation system you have. Also, dress for safety when handling pesticide.



Operate your irrigation system so that there is no runoff.
This is especially important when chemigating.



Don't operate your irrigation system so that it sprays into an open water system.
When chemigating this is illegal!