A Technical Introduction to Fertigation

Brief Introduction of Fertigation

Fertigation is a new agricultural technology that combines irrigation and fertilization. Fertigation technology uses a pressure system (or a height difference in the terrain), to combine soluble solid or liquid fertilizers with irrigation water, according to the soil nutrient content and the nutritional needs of the crop, and through the help of a controllable pipeline system. When the fertilizer has been integrated into the irrigation water, it then evenly, regularly, and quantitively waters the growth and developmental root zone of the crops, through the pipeline and the drippers. This allows the root soil to remain loose and to maintain the appropriate water content. It also allows farmers to design the fertigation system according to
the characteristics of different vegetables, the soil environment, the current nutritional state of the crops, the water demand of vegetables in different growth periods, and fertilization cycles, so that the crops receive a proportional amount of water and nutrition regularly and quantitively.

Applications

This technology is suitable for fixed water sources such as wells and reservoirs. It should also be promoted and applied in areas that have good water quality, that are in line with micro-irrigation requirements, and that have already set up or have the conditions to set up micro-irrigation facilities. It is mainly applicable to agriculture, horticulture, cultivation of large-scale industrial crops such as cotton, as well as other economically viable crops.

Advantages of Fertigation

The advantages of this technology include faster fertilizer activation and better fertilizer utilization efficiency. Fertigation can be used to avoid problems such as volatilization losses, slow dissolution, and slow fertilizer activation that arise from applying fertilizer onto dryer surface soils; it is used in particular to avoid the volatilization losses of ammonium and urea nitrogen fertilizers that occur when applied directly onto the surface soil, helping you save nitrogen fertilizer and protect the environment. Therefore, fertigation technology significantly improves the fertilizer utilization efficiency. Fertigation systems save 50-70% more fertilizer than conventional fertilization systems; also, it greatly reduces the water pollution problems that arise from excessive use of fertilizers in agriculture and horticulture. Since the amount of fertilizer used in fertigation can be controlled and adjusted manually, it helps ensure that the crops’ nutritional needs are met during its critical growth period, solving any element deficiency symptoms, and therefore achieving the objectives of having both good yield and good quality.
Essentials of Fertigation

Fertigation is a comprehensive technology that involves farmland irrigation, crop cultivation, and soil management, its four main technical essentials are as follows:

1. First, building a drip irrigation system.

In terms of design, one should design the depth, length, and irrigation area of the pipeline system according to the terrain, plots, units, soil texture, method of cultivation, and water features of the field. For the irrigation of the fertigation system, one could apply methods such as pipeline irrigation, sprinkler irrigation, micro-sprinkler irrigation, pump drip irrigation, gravity drip irrigation, and small-pipe-flow irrigation. One should avoid using flood irrigation, which is likely to cause nitrogen loss, as well as leading to a lower water utilization efficiency.

2. Fertilization system

One should design the field for quantitative fertilization, this includes designing the location, capacity, output, fertilizer pipeline, distributor valve, water pump and fertilizer pump of the storage tank and fertilizer pool accordingly.

3. Choosing a suitable type of fertilizer

One could choose a liquid or solid fertilizer such as ammonia, urea, ammonium sulfate, ammonium nitrate, monoammonium phosphate, diammonium phosphate, potassium chloride, potassium sulfate, potassium nitrate, calcium nitrate and magnesium sulfate; for solid fertilizers, one
should opt for fertilizers in powder or small block form, with a strong water solubility and a minimum amount of impurities. Granular compound fertilizers are in general not recommended; if using a biogas slurry fertilizer or a humic acid liquid fertilizer, it must first be filtered to avoid clogging the pipeline.

4. Operation of the fertigation system

1）. Mixing and dissolving the fertilizer: when applying a liquid fertilizer, it is not necessary to stir it or mix it. Most solid fertilizers, on the other hand, need to be mixed with water to become a liquid fertilizer and if necessary, need to be separated to prevent problems such as precipitation.

2）. Controlling the amount of fertilizer: it is necessary to control the dosage when applying the fertilizer, the appropriate concentration of fertilizer should be about 0.1% of the irrigation flow. If the irrigation flow is 50 m³ per 1000 m², then the amount of fertilizer you use should be about 50 liters per 1000 m²; excessive use of fertilizer may cause the crops to die and lead to environmental pollution.

3）. The fertigation process can be broken down into three stages: in the first stage, the soil is moisturized with unfertilized water; in the second stage, a liquid fertilizer is added to the irrigation flow and irrigation begins; in the third stage, the irrigation system is cleaned with unfertilized water.

Implementation Effects
Saving fertilizer, water, and labor, reducing humidity and crop diseases, while increasing production efficiency.

4. If it is a latch solenoid valves, please check if the controller is compatible with the IrriRich solenoid valves.

5. If it is a magneto-insulated solenoid valves, the permanent magnet in the solenoid may be demagnetized.
1. Balanced intake of water and fertilizer

When using the traditional method of irrigation and top dressing, the crops are starved for a few days, then are full for a few days; they cannot “eat and drink” in a balanced way. But when using fertigation, water and fertilizer can be provided regularly according to the crops’ needs, ensuring that the crops can “eat comfortably” and “drink happily”.

2. Saving time and labor

The traditional method of furrow irrigation and fertilizer application requires time and labor, and is very troublesome. The use of drip irrigation, on the other hand, only requires opening the valve and closing the electric gate; it requires almost no work!

3. Saving water and fertilizer

Fertigation provides the crops with the fertilizer that they require, directly and evenly through the water to the roots of the crops. The crops can therefore “enjoy and savor their drink”, significantly increasing the utilization efficiency of the fertilizer, saving up to 50% of fertilizer, while using only 30-40% of the water that furrow irrigation uses.
4. Preventing crop diseases

Many diseases that affect greenhouse crops are soil-borne diseases that spread through water, such as pepper blight, tomato wilt, etc. Using drip irrigation can directly and effectively control the occurrence of soil-borne diseases. Drip irrigation can reduce the humidity inside the greenhouse, reducing the risks of crop diseases.

5. Controlling the temperature and humidity

Using drip irrigation during winter can control the amount of water used, reduce humidity, and raise ground temperature. The use of traditional furrow irrigation, on the other hand, will lead to soil compaction and poor permeability, leaving the roots of the crops with hypoxia, and ultimately causing the roots to rot. Switching to drip irrigation will prevent symptoms such as rotting roots and yellow leaves that are caused by excessive irrigation.

Please contact us if you have encountered any problems with IrriRich irrigation solenoid valves, or if you have any questions about their installation and deployment. IrriRich is always ready to help our customers in all the way we could.