

Practical Fertigation of Berry Crops: From Venturis to Automation

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irribiz

Fertigation: What are my options?

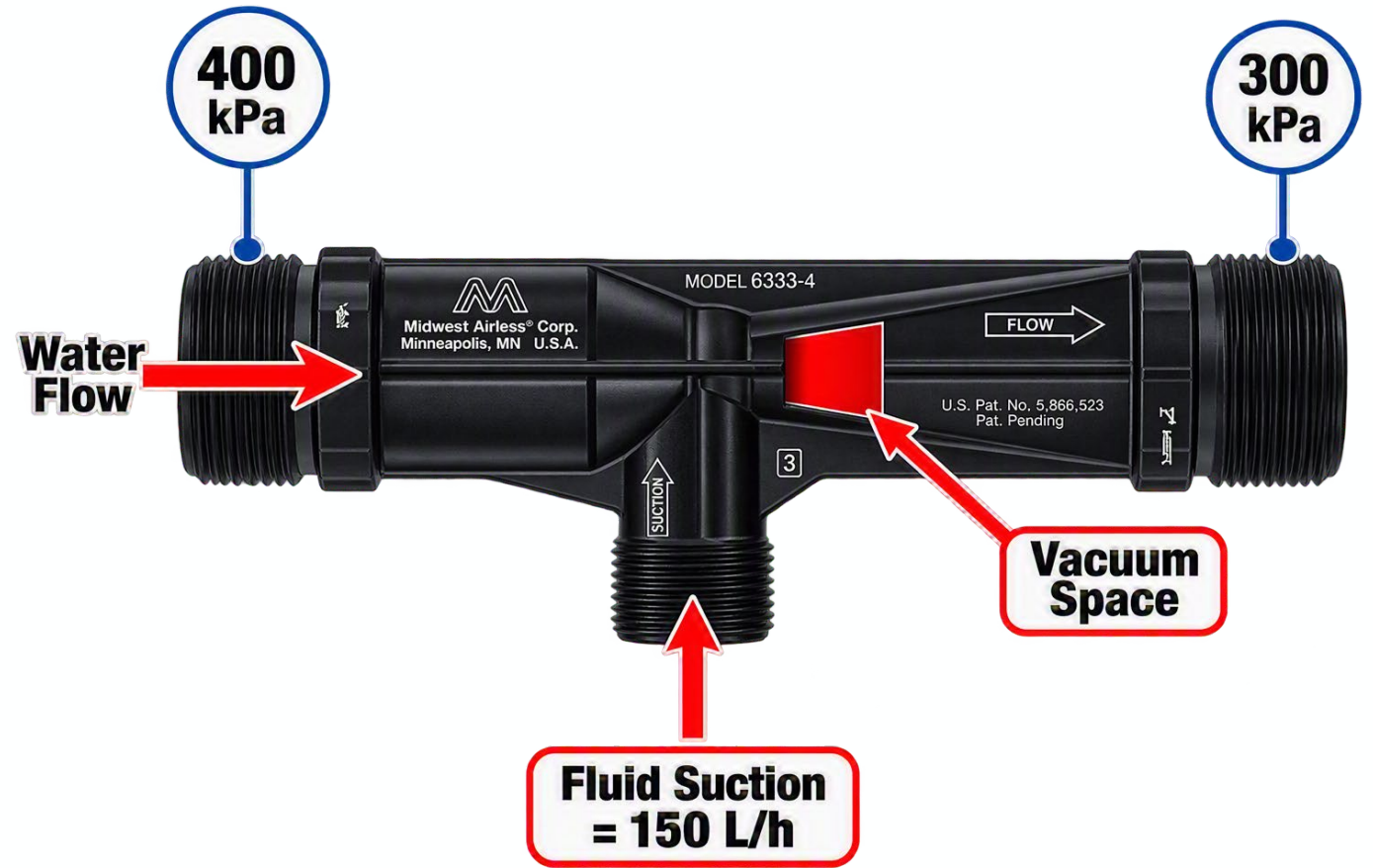
How do we get the fertiliser into the irrigation water reliably and consistently?

- Basic manual venturi or “*Mazzei Injector*”
- Proportional injectors like ‘dosatron’ or ‘mixrite’
- Wi-Fi, radio, IoT monitoring and notifications
- Fully automated fertigation through an advanced controller

VENTURI INJECTORS:

How?

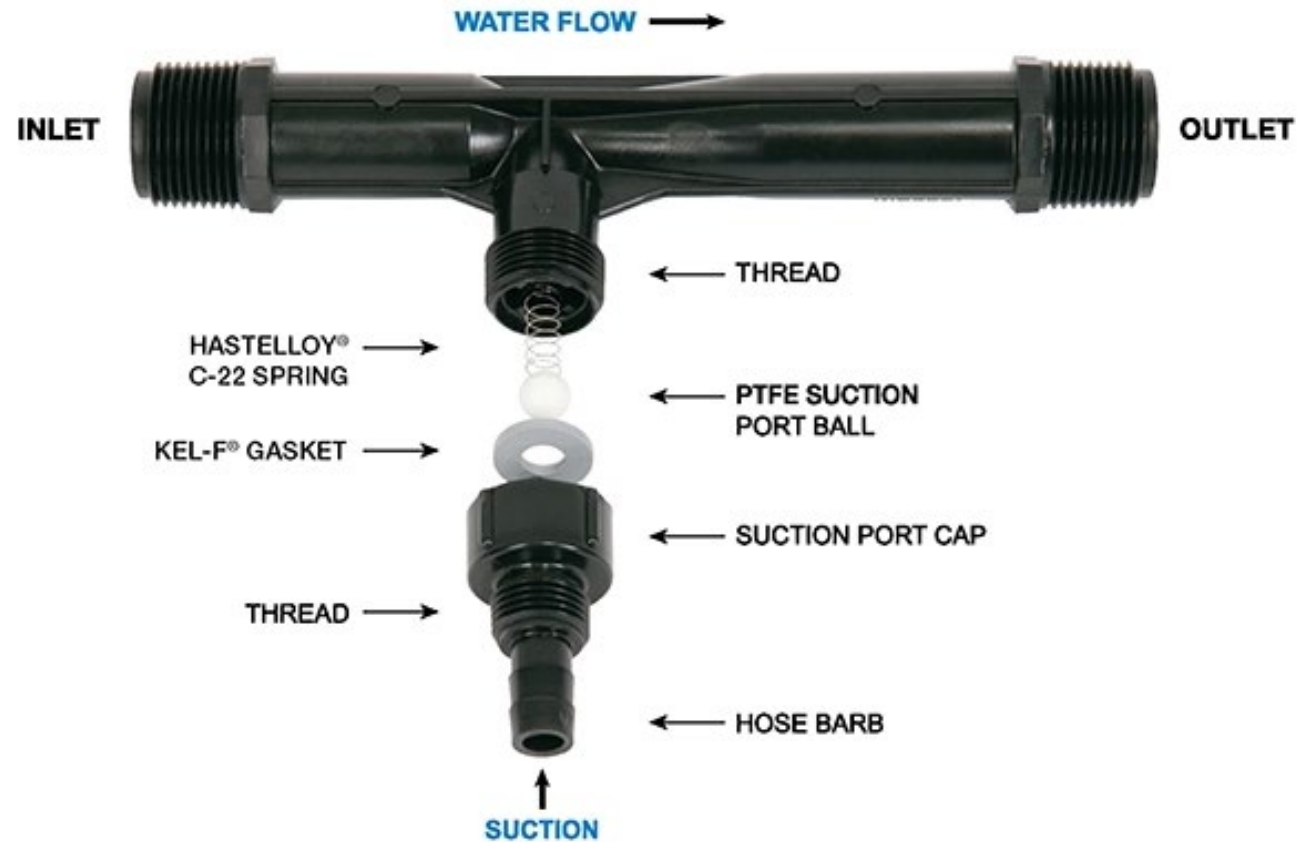
- Pressure differential.
- Water forced through a narrowing
- Velocity increases
- Pressure drops
- Vacuums up fertiliser



VENTURI INJECTORS:

The Good!

- Simple plumbing
- Cheap
- Easy to operate
- Robust
- Low maintenance



VENTURI INJECTORS:

The Bad!

**The catch: pressure differential -
You don't get something for nothing.**

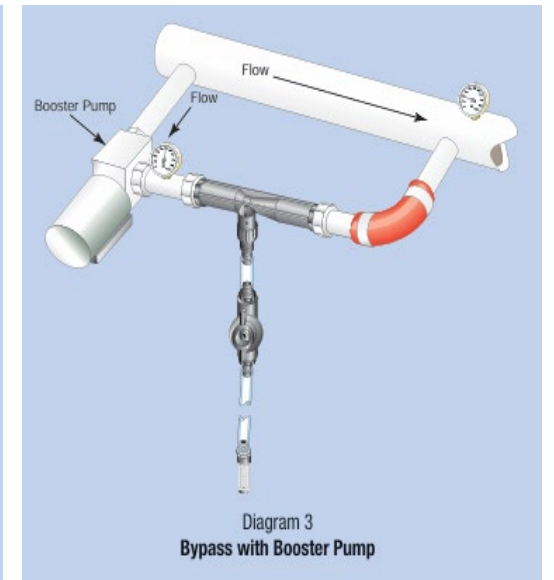
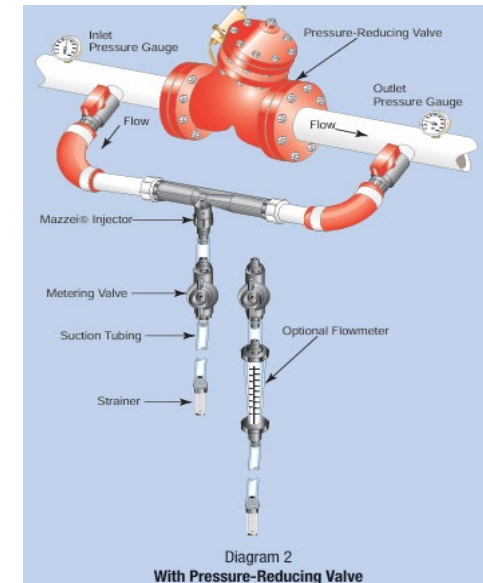
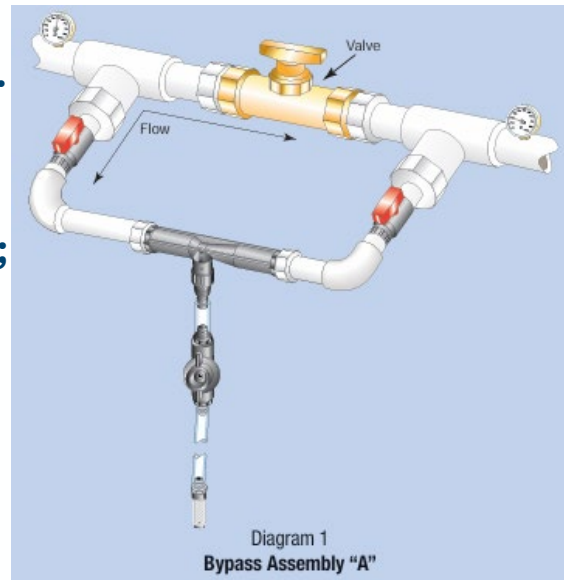
pH Control

**Installing the injector inline and
allowing it to create a pressure loss;**

Installing it on a bypass;

Using a pressure-reducing valve;

Or, where necessary, using a booster pump.



VENTURI INJECTORS:

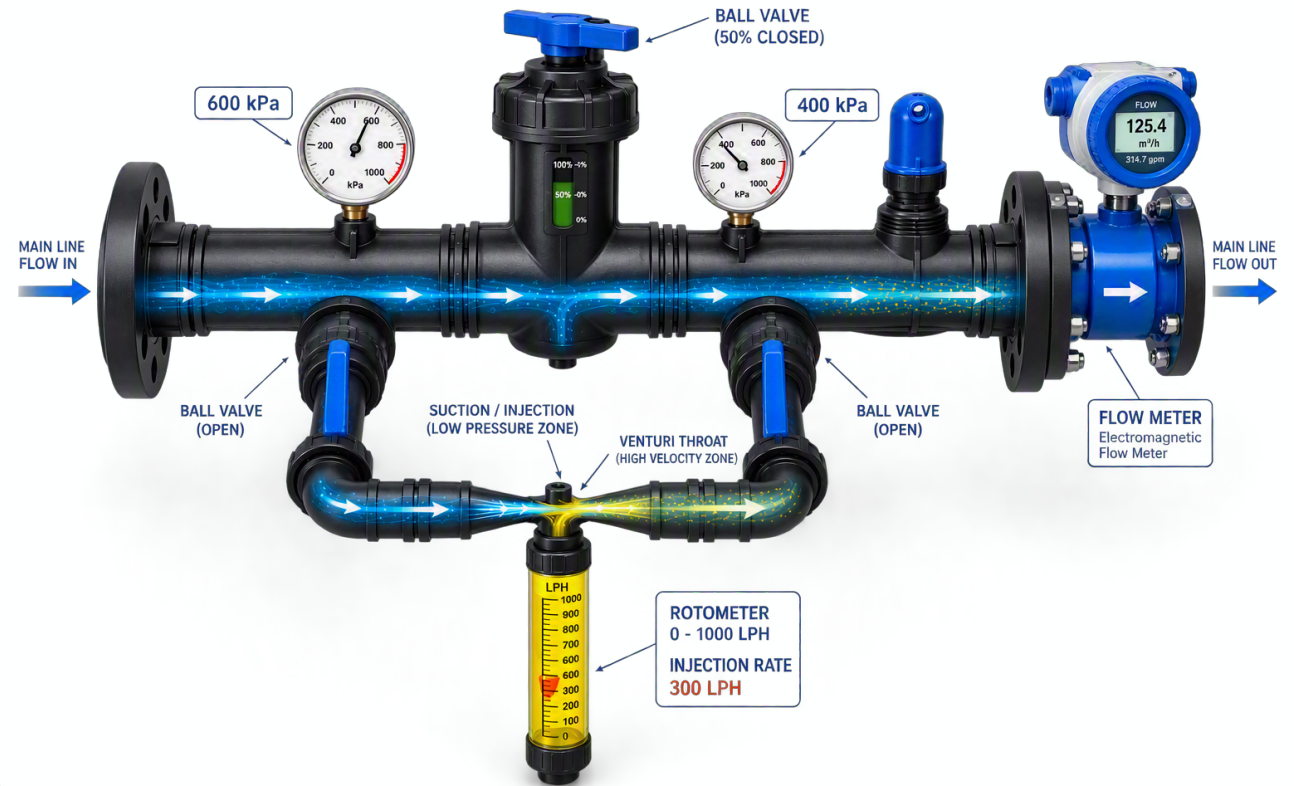
Practical Points

- ❖ **Measure everything**
- ❖ **1% calibration**
- ❖ **Size Correctly**

You need to know:

- Available inlet pressure
- Downstream pressure required
- Water flow through the injector
- Required fertiliser injection rate

Those are the numbers that determine whether the injector will give you the right outcome



Proportional Injectors:

How?

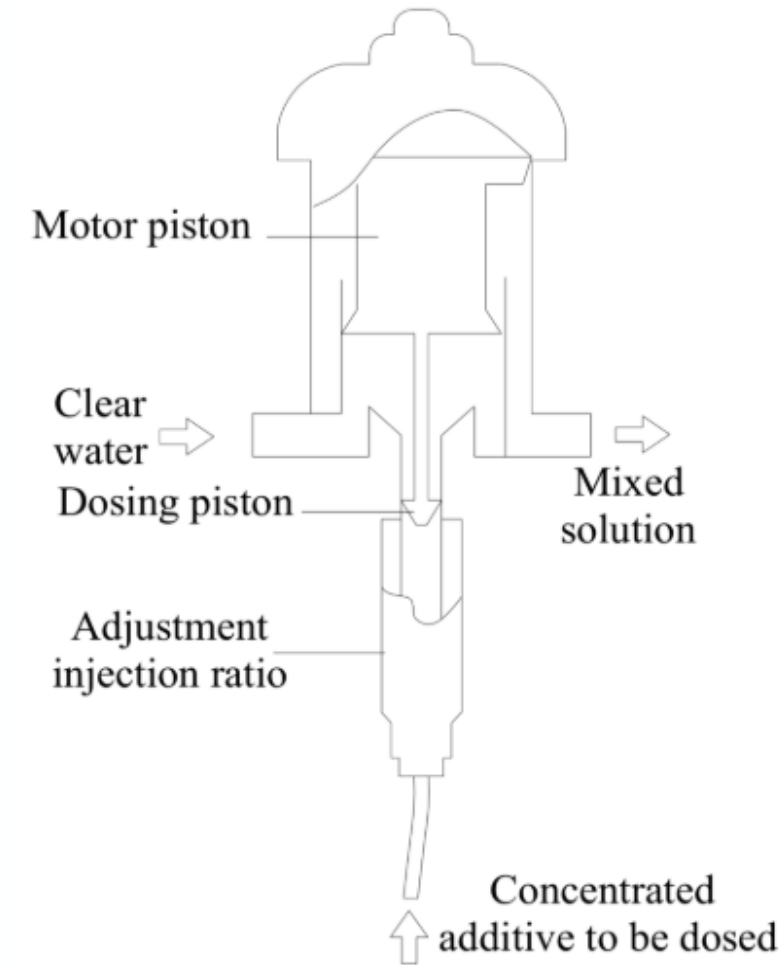
Proportional injectors operate by using the **flow of water to drive the injection of chemicals**, so the amount of chemical added is directly proportional to the water passing through the system.

Considerations

Flow rate and system pressure:

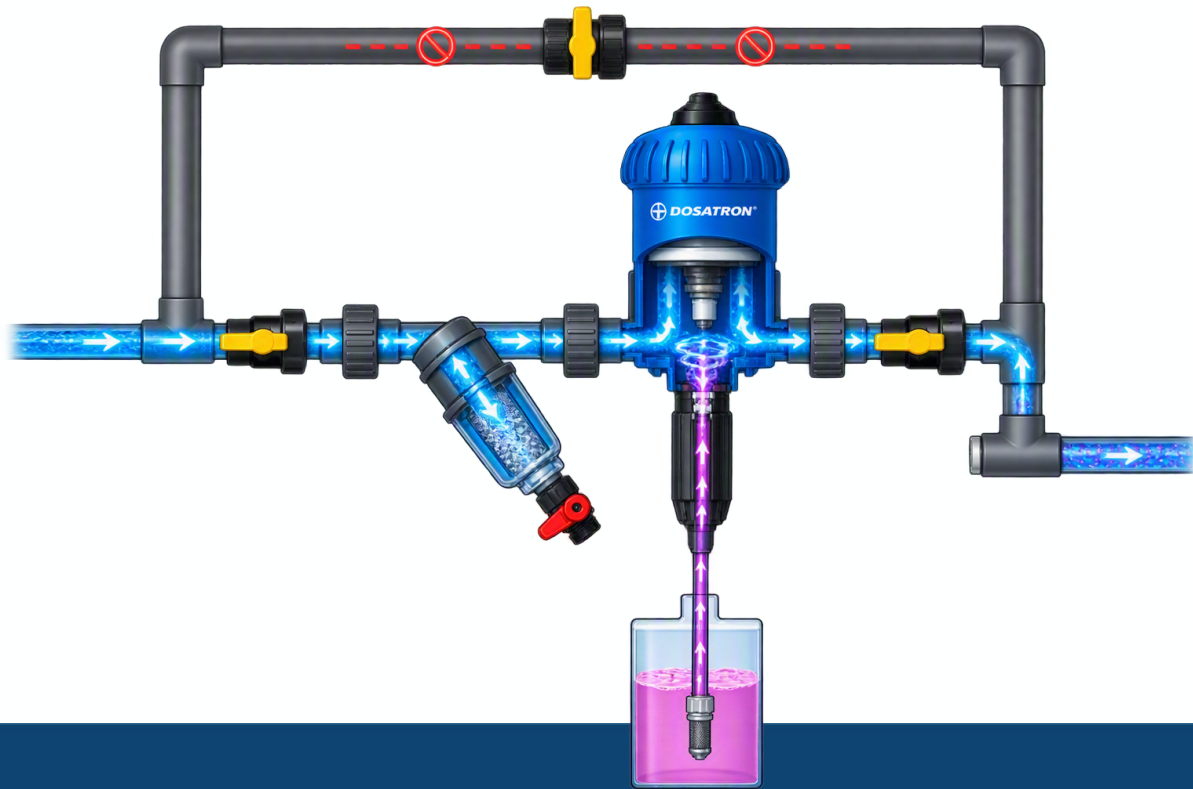
Chemical type:

Desired injection ratio:



Proportional Injectors: Types of Installation

Inline



Benefits

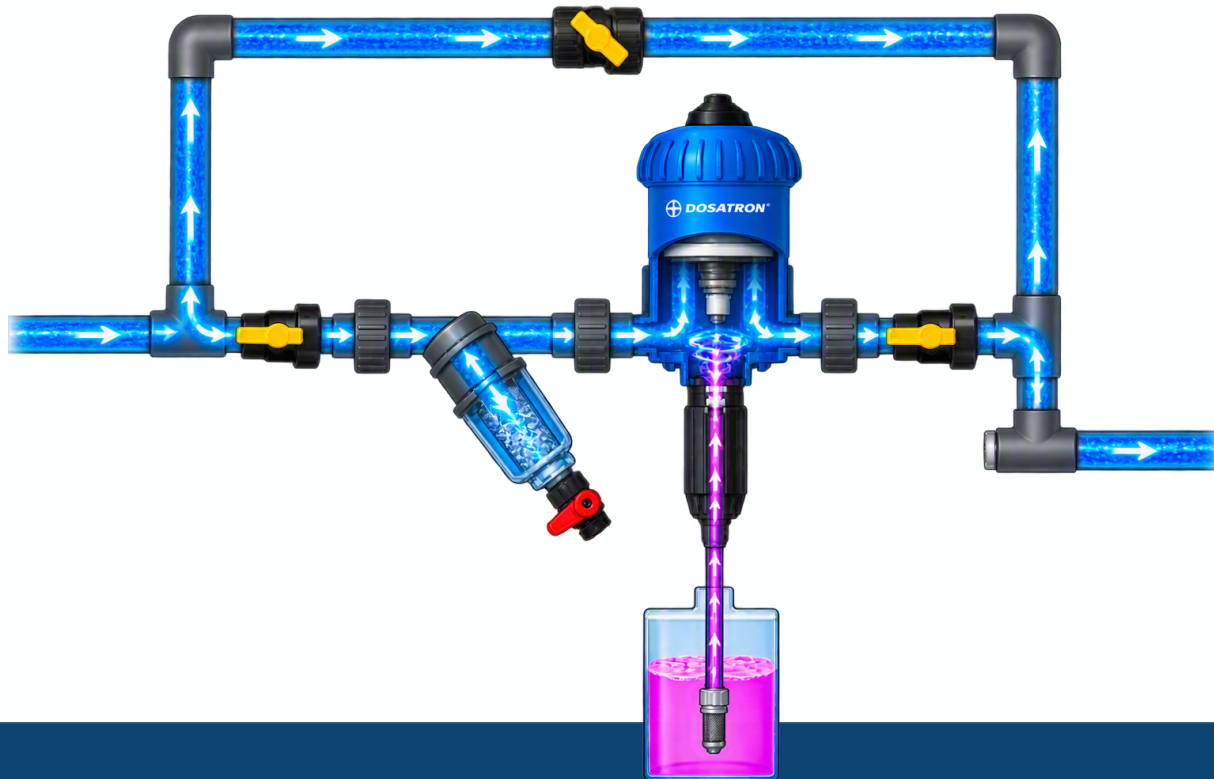
- Simple plumbing arrangement
- Injection ratio is proportional to water flow.
- Good repeatability
- Relatively easy to understand and operate.

Downsides

- Pressure loss
- Minimum and Maximum Flow sizing
- Big Flow = Big \$

Proportional Injectors: Types of Installation

Bypass



Benefits

- Big Flows - 120m³/hr +
- Less Pressure Loss
- Good for large, same sized shifts

Downsides

- Unstable E.C on different flow rates
- Incorrect bypass valve settings
- Bypass Tap/valve not closed enough
- More Plumbing
- Harder to tune injection ratio for desired rate

Proportional Injectors:

Practical Points



“A proportional injector is not a set-and-forget device. The percentage on the dial is only the target setting; calibration confirms the actual delivery rate.”

- **Know Your desired injection ratio**
- **1% Calibration**
- **Meter your fertiliser**
- **Maintenance**
- **The Rule of One!**



Monitoring and Notifications



- **Irrigation Controller**
 - water flowmeters
 - Electrical shorts
- **E.C and pH feedback**
- **What did you intend to inject?**
- **What's going to the berries?**

That is where monitoring and feedback becomes extremely useful.

Bluelab Guardian Inline Monitor

The injector is doing the work. The Guardian is checking the result.

Automated Fertigation: Why?



Up until this point, we've been talking about systems that are relatively simple.

A Venturi can get fertiliser into the water.

A proportional injector can maintain a consistent injection ratio.

And monitoring gives you feedback to help verify what is happening.

But as a farm becomes larger and more complex, there comes a point where simply injecting at one fixed ratio is no longer enough.

That's where fully automated fertigation starts to make sense.

Automated Fertigation: When?



Not every farm needs an automated fertigation system!

But if you have:

- Multiple crops;
- Multiple varieties;
- Different crop stages;
- Different nutrient recipes;
- Different ECs;
- Multiple independently controlled blocks;
- Or increasing labour requirements;

Then it makes sense, And life easy!

Automated Fertigation: How?

Automation is not just about turning fertiliser on and off



The controller knows which block is running.

It knows the required:

- Irrigation duration or volume;
- Fertiliser recipe;
- Target EC;
- Target pH.

The system then controls the dosing equipment to deliver that recipe.

“When this block irrigates, this is the recipe, and this is the strength solution I want to deliver.”

That is a very different level of control compared with simply switching a fertiliser injector on when the irrigation starts.

Automated Fertigation

Key Take aways

Automation isn't necessarily about having the most advanced technology.

Reduces the complexity

A complex farm may eventually need automation simply to make the operation manageable.

Sometimes cheaper

You need to know what reached the plant.

Automation gives you the ability to control and record the process.

But calibration and verification are still essential.



Summary

Venturi

- Low cost
- No moving parts
- Simple
- Reliable
- Requires correct pressure differential

Proportional Injectors

- Consistent injection ratio
- Water-powered
- Simple operation
- Can handle changing irrigation flow

Monitoring and Notifications

- Measure EC
- Measure pH
- Measure temperature
- Identify problems quickly
- Verify what is being delivered

Automated fertigation

- Automated irrigation
- Automated dosing
- Multiple crop programs
- EC and pH management
- Alarms
- Data
- Remote management

Closing

Best isn't the most expensive

Is understood by the people operating it;
Delivers fertiliser accurately;
Is appropriate for the size and complexity of the farm;

“You can grow excellent berries with a venturi.
You can grow excellent berries with a proportional injector.
You can grow excellent berries with fully automated fertigation”

The technology is there to make fertigation more accurate and easier to manage.

But regardless of the technology:

Measure it. Calibrate it. Monitor it

Because at the end of the day, it's not about what you told the system to do.
It's about what reached the plant.

Thank you



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