



Fertilizer-Injector Calibration

Fertilizer injectors are used for application of fertilizers, growth regulators, pesticides, wetting agents, and acids at different stages during crop production. They are the important component of a greenhouse or nursery operation. It's important to check the calibration of your fertilizer injector at least once before each growing season. Injector calibrations take only a few minutes, but a fertilizer injector out of calibration can quickly cause nutrient deficiencies if it isn't supplying an adequate amount of fertilizer. Conversely, if the injector is putting out too much fertilizer, it will waste money, may have adverse environmental impacts, and may lead to nutrient toxicities. There are two common calibration methods: the *flow method* and the *EC (electrical conductivity) method*. The flow method is a physical calibration, where the amount of stock solution taken up by the injector is compared to the amount of diluted fertilizer is discharged.

The EC method checks the concentration of soluble salts in the discharged water containing diluted fertilizer.

Below are the steps to follow for both methods.

Flow method

Injector ratio = diluted volume ÷ stock volume

- Place 500 ml of stock solution in a graduated cylinder.
- Remove all air bubbles from injector lead and place lead in graduated cylinder.
- Run water through the injector, collecting fertilizer in a large container to known volume (eg., 5 gallons; larger quantities for high ratios).
- Measure how much stock solution was used (in ml).
- Convert diluted volume to ml.
- Divide diluted volume by stock volume.
- Injector ratio calculated should be within 1% to 2% of the setting on your injector.

Example: Injector ratio = 18,925 ml (5 gallons) ÷ 94 ml (amount of stock used) = 201.

EC Method

- Calibrate EC meter.
- Measure EC of clear irrigation water.
- Measure EC of irrigation water at the end of the hose after injector.

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Fertilizing too much or too little are the most common nutritional problems in greenhouse production.



- Subtract EC of irrigation water from EC of fertilizer.
- Refer to fertilizer label.

What to look for:

Plants that grow slowly and look pale green to yellow might be an indication that you are not fertilizing enough. Dark green leaves, stunting, and burning of roots and leaves might be indication that you are applying too much fertilizer.

Check the fertilizer strength coming out of the hose or blended into the media to make sure you are reaching your fertility target. Also check the media EC to determine whether nutrients are building up or depleting in the root zone. Common tests for checking media EC include the saturated media extract (SME), the 2:1 dilution method, the PourThru method, and the “plug squeeze.”

Example: You want to apply 200 ppm N of Jack’s Professional 20-3-19 Petunia FeED Plus Mg. The clear irrigation water has an EC of 0.12, and the irrigation water at the end of the hose after the injector has an EC of 1.40. So, $1.40 - 0.12 = 1.28$

Cross-reference the values from the table on YOUR bag of fertilizer with the value you calculated from your EC values.

Desired N Feed Rate	Injector Setting			E.C. Value (mmhos)
	1:15	1:100	1:200	
50 ppm	0.50	3.38	6.75	0.32
100 ppm	1.00	6.75	13.50	0.64
200 ppm	2.00	13.50	27.00	1.28

From the label of Jack’s Professional 20-3-19 Petunia FeED Plus Mg. Each fertilizer is different; refer to the table specific to your fertilizer

If the EC of the solution isn’t correct, then check if you have a problem with the dilution ratio. For example, if your dilution ratio is 1:100, take 10ml from the stock solution and add it to 1 liter of water. If the EC is what you expect, then adjust your injector up or down until you get the right EC. If the dilution is wrong, make sure to add the right amount of fertilizer per volume of water to obtain the correct ppm concentration shown on the fertilizer bag.

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