

MIXING CONCENTRATES



Fertilizer recommendations are most often given in terms of the concentration of a desired element in the irrigation water. This concentration is expressed as parts per million (ppm). For example, you may use a 20-10-20 fertilizer on poinsettias to supply nitrogen at a concentration of 300 ppm. For this, we normally use a fertilizer injector and make a concentrated fertilizer solution. To do this, you must determine how much of the fertilizer to put in the concentrate tank (or stock solution) so the injector gives the desired concentration in the irrigation water.

For rates in tablespoons per gallon, go down to “Testing accuracy of the injector” for directions.

Calculating for the Injector:

Fertilizer injectors take fertilizer solution out of a concentrate tank and inject it into the irrigation water. If the injector ratio is 1:100, this means 1 gallon of fertilizer concentrate is added to each 100 gallons of irrigation water. The thing to remember in doing calculations for injectors is that the fertilizer will be at a higher concentration in the concentrate tank than in the irrigation water.

Example 1:

You want to give tomato seedling 200ppm N using a 15-5-15 water-soluble fertilizer and an injector set at 1:100.

On the bag of fertilizer is this chart:

Feed Rate	EC	1:15	1:100	1:200
<i>Nitrogen</i>	<i>(mmhos)</i>	<i>Ounces/gallon of Concentrate</i>		
50 ppm	.37	.68	4.5	9
100 ppm	.74	1.35	9	18
200 ppm	1.48	2.7	18	36

If we look at where the 1:100 and the 200ppm meet, we can see that we need to add 18 ounces (by weight) to a gallon of water to make the needed concentrate. I normally use a 5 gallon bucket with my injector, so we would add (5 times 18) 90 ounces of fertilizer or since there are 16 ounces to a pound, 5lbs 10 ounces of fertilizer to my 5 gallon bucket and fill with water.

Example 2:

What if you wanted 225ppm N? Divide the 1:100/ 50ppm amount in half and add it to the 200ppm amount. $4.5/2 = 2.25 + 18 = 20.25$ ounces per gallon of concentrate.

Testing accuracy of the injector:

You should test your injector at least once year, especially if you haven't used it in a while or you haven't replaced wear parts in awhile. Hozons and other siphon injectors should be tested before use. Due to variations in manufacturing the injection rate will vary.

Use a measuring cup in the 6 cup range. Fill with water and drop the suction hose in. Use the same setup as you will use to water/fertilize your plants with. Fill a 5 gallon bucket. Make sure you do this near the faucet as shutting the water off at the end of the hose might send water back into the concentrate container. When the 5 gallon bucket is full, shut off the water and note how much water was sucked out.

Take 640 (128 ounces to a gallon, 5 gallons times 128 equals 640 ounces in 5 gallons) and divide by the number of ounces sucked out of the measuring cup. This will give you the second number to the 1:X ratio. For example, if a Hozon sucks 35.5 ounces out of the measuring cup after filling a 5 gallon bucket, it will be injecting 1:18 (640 divided by 35.5).

Once you know the injection rate, you can go about figuring a concentrate another way. Say you wanted to water transplants in with 9-45-15 at the rate of 2 Tablespoons per gallon. Times the rate by the second number of the ratio. For our Hozon this is 18 or for an injector set to 1:100, times by 100.

So if we are using our Hozon that injects at 1:18 which we found with our accuracy test, 2 Tablespoons times 18 gives up 36 tablespoons per gallon of concentrate. If we use a 5 gallon bucket, it would take 180 tablespoons of fertilizer to make 5 gallons of concentrate. Don't want to count to 180, use the following chart:

- 2 tablespoons = 1 ounce
- 2 ounces = $\frac{1}{4}$ cup
- 8 ounces = 1 cup
- 180 tablespoons = 11- $\frac{1}{4}$ cups of fertilizer in the 5 gallon bucket and fill with water.
After running through the Hozon, you will have 90 gallons of fertilizer