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Professional Plant Nutrition

Guidelines For Calculating Veg Feeds

Prior to creating the feed solution we want to always pre pH the solution with the appropriate Acid to a pH of 5.6-5.7. We want to make our pH adjustments **prior** to incorporating the Base Nutrient followed by incorporation of the Veg Nutrient. In most cases the appropriate Acid will be Sulfuric Acid. In some cases other acidification agents such as Phosphoric Acid, Nitric Acid etc. will be ideal, dependent upon irrigation water analysis data. If you are unsure about your water quality or mineral content, we encourage you to contact Soilscape Solutions for assistance with Irrigation Water Analysis. If you do not already have bulk Sulfuric Acid, Phosphoric Acid or Nitric Acid we are happy to provide you with Agricultural Grade Acids in 55 gallon drum quantities.

When building any nutrient solution, for either Veg or Bloom growth stages, we want to always add Base to the Final Solution first, then move on to incorporate the Veg or Bloom.

We will be building nutrient solutions based on EC values, using an EC meter. It is important to understand ratios for this practice. When we are building a **Veg** feed solution, we always use Base and Veg at a ratio of 0.6:1 of our final EC. We can also look at this from a percentage perspective, in that Base to Veg are always used at 37.5% to 62.5% respective to each other when building the final EC.

Example: We are building a **Vegetative feed** and we want the final feed strength to be 1.5 EC. In this case 37.5% of the 1.5 EC is comprised of Base, and 62.5% of the 1.5 EC is comprised of Veg.

To calculate the Base component in the desired EC of 1.5:
1.5 EC X 0.375 = 0.56 EC - This means that 0.56 of the total EC is Base

To calculate the Veg component of the desired EC of 1.5:
1.5 EC X 0.625 = 0.93 EC – This means that 0.93 of the total EC is Veg

The combination of Base and Veg then becomes:
0.56(Base) + 0.93(Veg) = 1.5 (1.49) EC

When using our EC pen (Blue Lab EC pen is the preferred unit for this application) the pen will give us readings to the 1/10th of a number. Meaning the EC pen reads 0.1, 0.2, 0.3 EC etc. The pen is factory calibrated to round up, so for our purposes we will either round up or round down to our nearest 1/10th of our calculated EC.

Example:
Base EC of 0.56 we will round up to 0.6 EC
Veg EC of 0.93 we will round down to 0.9 EC
0.6 EC Base + 0.9 EC Veg = 1.5 EC of Final Solution
*Use the same formulas for calculating any finished **Veg Feed** EC value, 0.8, 1.0, 1.2, 1.6 etc.

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Guidelines For Calculating Bloom Feeds

Prior to creating the feed solution we want to always pre pH the solution with the appropriate Acid to a pH of 5.6-5.7. We want to make our pH adjustments **prior** to incorporating the Base Nutrient followed by incorporation of Bloom. In most cases the appropriate Acid will be Sulfuric Acid. In some cases other acidification agents such as Phosphoric Acid, Nitric Acid etc. will be ideal, dependent upon irrigation water analysis data. If you are unsure about your water quality or mineral content, we encourage you to contact Soilscape Solutions for assistance with Irrigation Water Analysis. If you do not already have bulk Sulfuric Acid, Phosphoric Acid or Nitric Acid we are happy to provide you with Agricultural Grade Acids in 55 gallon drum quantities.

When building any nutrient solution, for either Veg or Bloom growth stages, we want to always add Base to the Final Solution first, then move on to incorporate the Veg or Bloom.

We will be building nutrient solutions based on EC values, using an EC meter. It is important to understand ratios for this practice. When we are building a **Bloom** feed solution, we always use Base and Bloom at a ratio of 0.6:1 of our final EC. We can also look at this from a percentage perspective, in that Base to Bloom are always used at 37.5% to 62.5% respective to each other when building the final EC.

Example: We are building a **Bloom feed** and we want the final feed strength to be 1.5 EC. In this case 37.5% of the 1.5 EC is comprised of Base, and 62.5% of the 1.5 EC is comprised of Bloom.

To calculate the Base component in the desired EC of 1.5:
1.5 EC X 0.375 (37.5%) = 0.56 EC - This means that 0.56 of the total EC is Base

To calculate the Bloom component of the desired EC of 1.5:
1.5 EC X 0.625 (62.5%) = 0.93 EC – This means that 0.93 of the total EC is Bloom

The combination of Base and Bloom then becomes:
0.56 (Base) + 0.93 (Bloom) = 1.5 (1.49) EC

When using our EC pen (Blue Lab EC pen is the preferred unit for this application) the pen will give us readings to the 1/10th of a number. Meaning the EC pen reads 0.1, 0.2, 0.3 EC etc. The pen is factory calibrated to round up, so for our purposes we will either round up or round down to our nearest 1/10th of our calculated EC.

Example:
Base EC of 0.56 we will round up to 0.6 EC
Bloom EC of 0.93 we will round down to 0.9 EC
0.6 EC Base + 0.9 EC Bloom = 1.5 EC of Final Solution
*Use the same formulas for calculating any finished **Bloom Feed** EC value, 0.8, 1.0, 1.2, 1.6 etc.

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Guidelines For Diluting Fertilizer Into Feed Reservoir (Tank Mixing Fertilizers)

In this scenario we will cover the process in which we will build a feed solution by directly diluting and dissolving our fertilizer into the feed tank. For this exercise we will need to know how many Grams of each product will be required to achieve our desired EC value.

Standards:

Base: Used at a rate of 1g/gallon will add 0.3 EC

Veg: Used at a rate of 1g/gallon will add 0.25 EC

Bloom: Used at a rate of 1g/gallon will add 0.23 EC

To determine Gram weights of either Base, Veg or Bloom:

1. We want to build a feed solution for **Veg** growth stage, with a total EC value of 1.0

2. After using our previous EC calculation formulas we know want to add
   -0.4 EC of Base (1.0 EC X 0.375 = 0.375 – rounded up to 0.4 EC)
   -0.6 EC of Veg (1.0 EC X 0.625 = 0.625 – rounded down to 0.6 EC)

3. Divide the target Base EC value by the above Standard to arrive at g/gallon needed
   -0.4 EC (target) / 0.3 EC (1g/gallon) = 1.33 grams per gallon required to achieve target EC
4. Divide the target Veg EC value by the above standard to arrive at g/gallon needed
   -0.6 EC (target) / 0.25 EC (1g/gallon) = 2.4 grams per gallon required to achieve target EC

5. Now we plug these figures into our reservoir size, our reservoir is 500 gallons
   - 500 gallons X 1.33 grams/gallon = 665 grams of Base required
   - 500 gallons X 2.4 grams/gallon = 1,200 grams of Veg required

* It is important to remember, we always want to dilute/dissolve Base before adding either Veg or Bloom to the reservoir.

Other Considerations for Tank Mixing:

1. Water temperature plays a large role in the ability for the fertilizers to be dissolved adequately. The colder the water, the more difficult it is to dissolve the fertilizers. The warmer the water, the less difficult it is to dissolve the fertilizers. Ideal water temperature is 65*-72* F.
2. Recirculating the water in the reservoir will help with fertilizer solubility and the rate at which it dissolves. Using a recirculating pump will also help to ensure that the mix tank is completely homogenized. Using a recirculating pump will also help with accurate pH and EC readings.
3. Use your calculated gram/gallon dosages applied to 85-90% of the total reservoir volume first. Then take your EC reading. As needed, dilute the solution with the addition of more water until you arrive at the desired EC value.

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Guidelines For Making Stock Solutions
This is the preferred method of use

Stock solutions are prepared to serve as liquid concentrates of our different fertilizers. In this process you will be making your own liquid fertilizer, to be used at ml/gallon application rates to your final feed reservoir. Stock solutions may be used as an alternative to Tank mixing the fertilizers in their salt forms, and is our preferred method. Stock solutions are used to save preparation time, conserve materials, reduce storage space, and improve accuracy of application. Of most importance is water temperature, as it plays a large role in the ability for the fertilizers to be dissolved adequately. The colder the water, the more difficult it is to dissolve the fertilizers. The warmer the water, the less difficult it is to dissolve the fertilizers. Ideal water temperature is 65*-72* F.

Standard Rates For Soil Growers Not Implementing Injectors Or With Cold Water Storage Tanks:

Base: Dissolve at a rate of 2lbs/Gallon of Final Stock Solution

Veg: Dissolve at a rate of 2lbs/Gallon of Final Stock Solution

Bloom: Dissolve at a rate of 2lbs/Gallon of Final Stock Solution

Examples:

- **Dissolve 50lbs of Base, Veg or Bloom to 25 Gallons of Water**
- **Dissolve 100 lbs of Base, Veg or Bloom to 50 Gallons of Water**
- **Dissolve 300 lbs of Base, Veg or Bloom to 150 Gallons of Water**

The Process:

1. Use a container, such as a 30 gallon drum, 55 gallon drum, 275 gallon IBC Tote etc
2. Fill water to 80% of final volume (20 gallons for a 25 gallon stock solution etc.)
3. Incorporate the Fertilizer at the rate (2lbs/Gallon) ex. 50lbs for 25 gallons of Final Stock Solution
4. Vigorously agitate/stir the solution with a paint mixer attached to a drill, or a recirculating pump
5. Once the Fertilizer has completely dissolved, top off the Stock Solution tank to the correct level

- Fertilizer plus water should equal the final volume, do not add 50 lbs to 25 gallons directly
- ALWAYS make Stock Solutions at the SAME concentration, this will ensure accuracy of app rates
- Each Stock Solution should be made and kept separate from the next. DO NOT MIX STOCKS

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Using Stock Solutions to build Feeds
For Soil Growers Making Stock Solutions at 2lbs/Gallon

Now that we have made our Stock Solutions we will review their use rates in ml/Gallon for building feed reservoirs. It is important to remember to ALWAYS make our stock solutions at the same concentrations (2lbs Fertilizer per 1 gallon of water). When Stock Solution concentrations are consistent, then our ml/gallon application guidelines will be consistent also.

We will now make a table as a guideline for our different feed strengths, based on EC value. We will use the information from the previous pages to calculate the different Base, Veg and Bloom application rates in ml/Gallon from our Stock Solutions.

Veg Feed

Bloom Feed

	BASE STOCK	VEG STOCK		BASE STOCK	BLOOM STOCK	700 SCALE PPM
EC Value:	**ml/Gal**	**ml/Gal**		**ml/Gal**	**ml/Gal**	**Equivalent**
0.6 XX Light	3ml	6ml		3ml	6.75ml	420ppm
0.8 X Light	4ml	8ml		4ml	9ml	560ppm
1 Light	5.25ml	10.5ml		5.25ml	11.25ml	700ppm
1.2 Medium	6.25ml	12.5ml		6.25ml	13.5ml	840ppm
1.5 Average	7.75ml	15.5ml		7.75ml	17ml	1050ppm
1.8 X Strong	9.5ml	19ml		9.5ml	20.5ml	1260ppm
2 XX Strong	10.5ml	21ml		10.5ml	22.75ml	1400ppm

Examples:

- Veg feed at 1.5 EC for a 500 Gallon res will be: 3,875ml of **BASE** and 7,750ml of **VEG**
- Veg feed at 1 EC for a 1,200 Gallon res will be: 6,300ml of **BASE** and 12,600ml of **VEG**
- Bloom feed at 1.2 EC for a 500 Gallon res will be: 3,125ml of **BASE** and 6,750ml of **BLOOM**
- Bloom feed at 1.8 EC for a 1,200 Gallon res will be: 11,400ml of **BASE** and 24,600ml of **BLOOM**