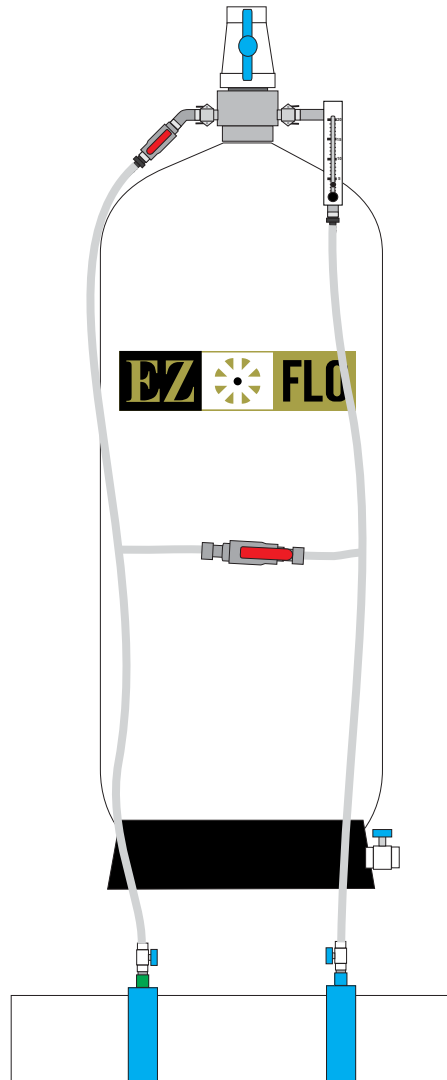




Injection Systems

INSTALLATION AND OPERATING GUIDE HI FLO VERTICAL TANK SYSTEMS



When the HI-FLO Metering Head is attached to a tank, the tank will be pressurized to the same pressure as the irrigation system. Before attaching a tank or other storage device to the irrigation system, make sure the tank is capable of safely containing the pressure of the irrigation system. EZ-FLO assumes no responsibility for failures of tanks that are not manufactured by EZ-FLO.

**FOR ASSISTANCE VISIT OUR WEBSITE AT
www.ezflofertilizing.com
CALL TOLL FREE 1-866-393-5601**

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Injection Systems

SYSTEM COMPONENTS Tank Overview

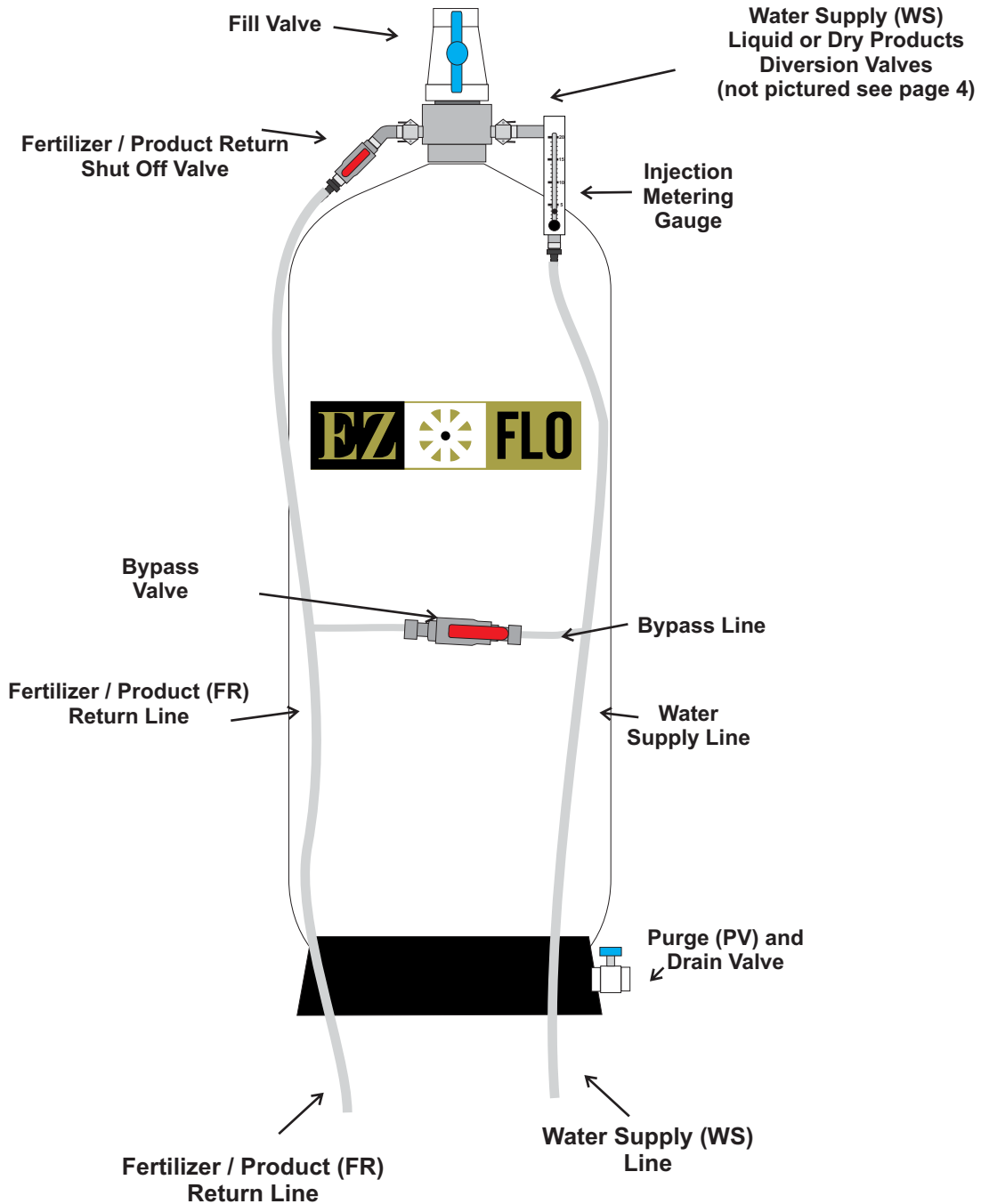


Figure 1

**SYSTEM COMPONENTS
Head Assembly**

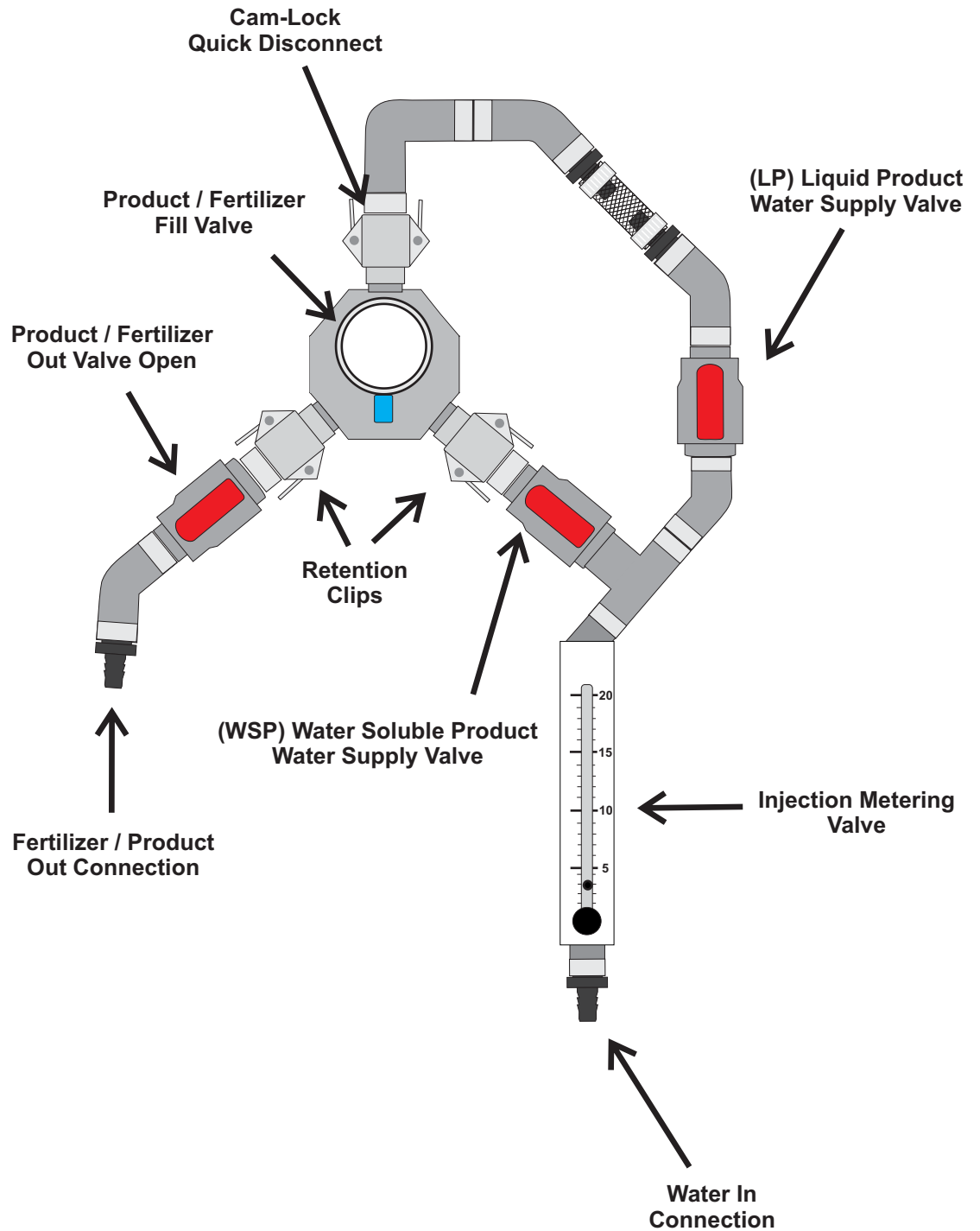


Figure 2

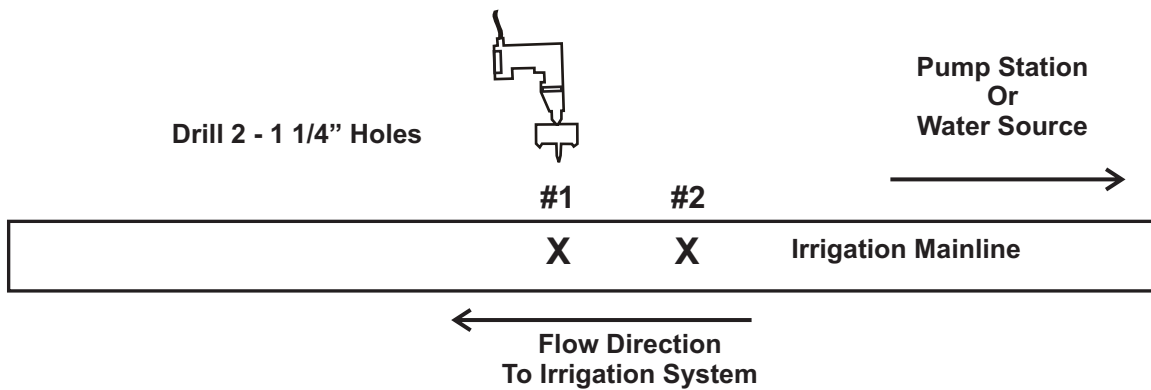
Connection Options

The EZ-FLO Hi-FLO system may be installed using the engineered Saddle Venturi Connection (SVF) or a prefabricated coupling connector. If utilizing the SVF connection, please contact an EZ-FLO representative to insure proper considerations for pressure and flow have been identified.

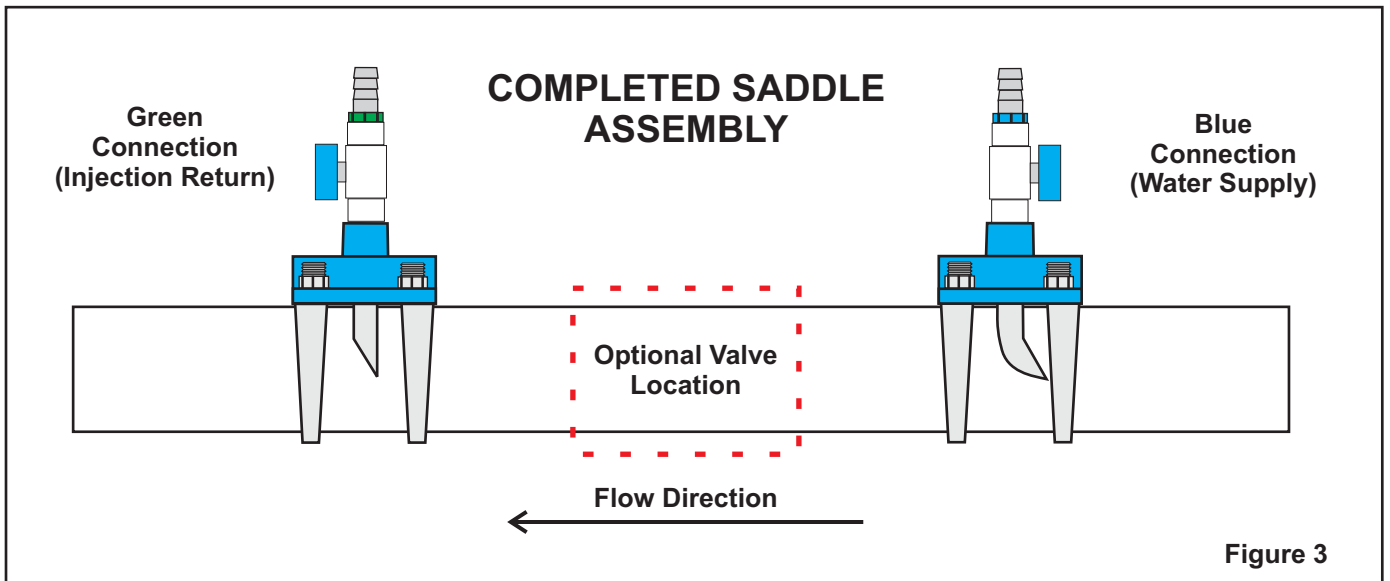
Saddle Venturi Connection (SVF)

Step 1 - Drill (2) - 1 1/4" holes a minimum of 6" apart, in the irrigation main line near the installation location of the EZ-FLO System. Make sure there is enough room for the saddles to attach snugly to the pipe. Hole Saw or Reaming bit is recommended.

CAUTION: DRILL SLOWLY TO PREVENT PIPE FRACTURE



Step 2 - Attach saddle to pipe. The blue connection should be installed in the first drilled hole in the irrigation main line with the venturi probe opening facing into the water flow. The green connection should be installed in the second drilled hole in the irrigation main line with the venturi probe opening facing away from the water flow.



Note: A butterfly or ball valve may be required for low flow irrigation mainline to allow for throttling. This will increase the differential pressure necessary to operate the system. Contact an EZ-FLO representative for more details and calculations.

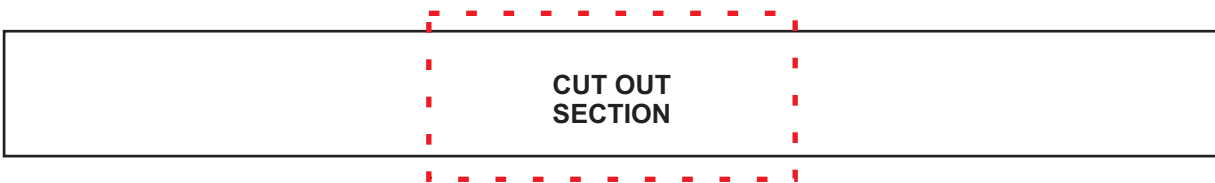
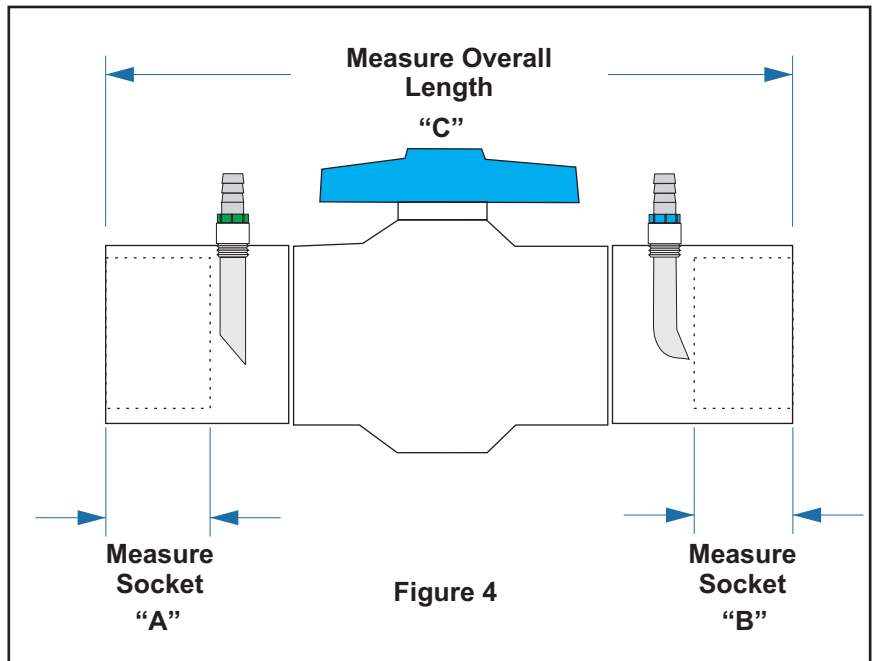
HIGH FLO COUPLING (HFC)

Step 1 - Cut out appropriate section of pipe by measuring the socket depth of the connector and the overall length as shown in figure 4. Due to variations in the fabrication process it is highly recommended each fitting be measured before installation to insure proper spacing.

After measuring, use the simple formula of:

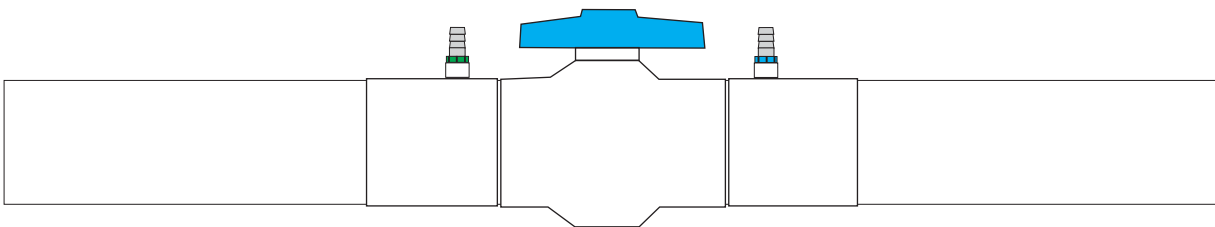
$$A + B - C = \text{Cut Out Length}$$

Note: You may also use a slip fix or uno to facilitate easier installation.



Irrigation Mainline

Step 2 - Use standard solvent cementing techniques to install the HFC connection into the PVC main lin.



Irrigation Mainline

Flow Direction



Note: The HFC connection includes a ball valve for throttling. This may be required for low flow irrigation mainline to allow for throttling. This will increase the differential pressure necessary to operate the system. Contact an EZ-FLO representative for more details and calculations.

To connect the system to the irrigation line

Step 1 - Familiarize yourself with the various connection points and valves on the EZ-FLO injection system. **Make sure all valves are in the closed position before proceeding.**

Step 2 - Connect tubing to the system and to the irrigation line. Connect the water supply **WS** tubing to the water supply connection on the irrigation main line and tank mixing head. Connect the fertilizer return **FR** tubing to the fertilizer return connection on the tank metering head and the irrigation main line as shown in figure 5.

The connections are color coded or labeled for easy reference. Secure all tubing connections using the provide tubing clamps. Do not over tighten clamps or stress tubing barb.

Step 3 - Fill with water through the top fill valve.

Step 4 - Once full, turn all the water supply valves to the on position to pressurize and check for leaks. Tighten any leaking parts before proceeding. Figure 7 displays various valves on the head in the on position. The metering valve and the (Optional) shut off valves from the irrigation mainline connection must also be open to supply pressure to the tank.

* All HF systems are pressurized at the factory to 125 psi but items may shift or loosen during handling and transport

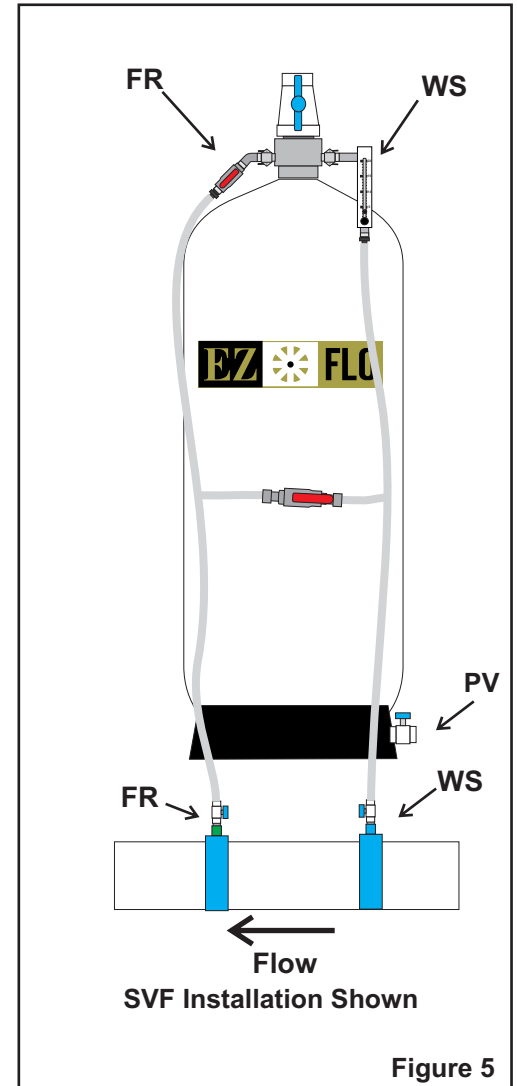


Figure 5

Step 5 - Shut off all valves and open the bottom purge valve (PV) to depressurized and drain the tank. After the purge valve is opened, open the fill valve for additional venting assisting in the draining of the system.

Step 6- Close bottom purge valve (PV) before adding product to the tank.

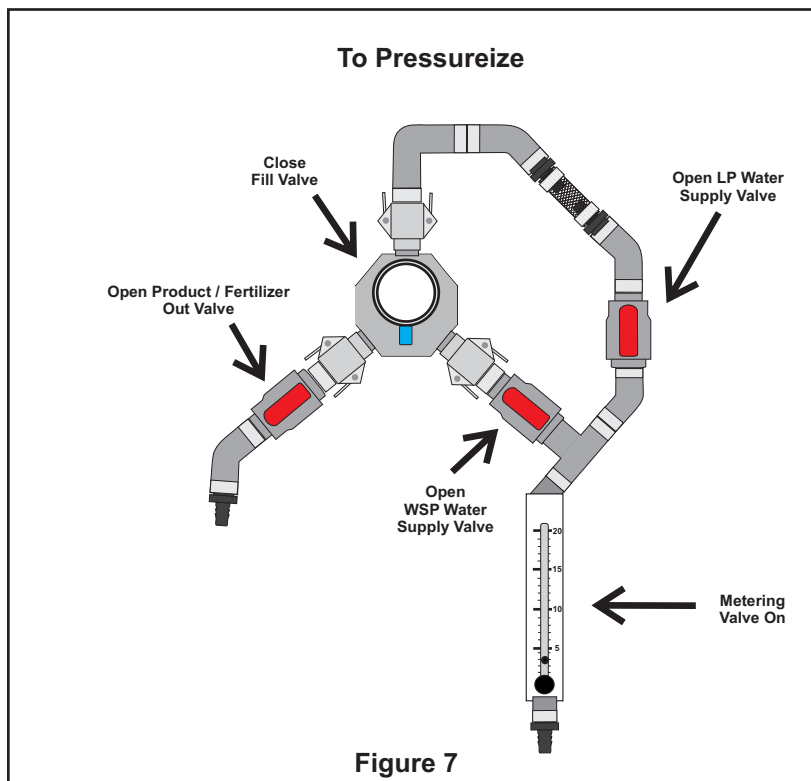


Figure 7

Injecting Water Soluble Powder

The EZ-FLO system has the ability to inject Water Soluble Powder products (WSP), Liquid Products (LP), or a combination of both. To change between LP and WSP products, the appropriate valve must be opened. In figure 8 below, the system is configured to deliver WSP products or product requiring heavy agitation. This setting continually agitates the solution allowing for very high concentrations of product to be placed in the system without the concern of plugging.

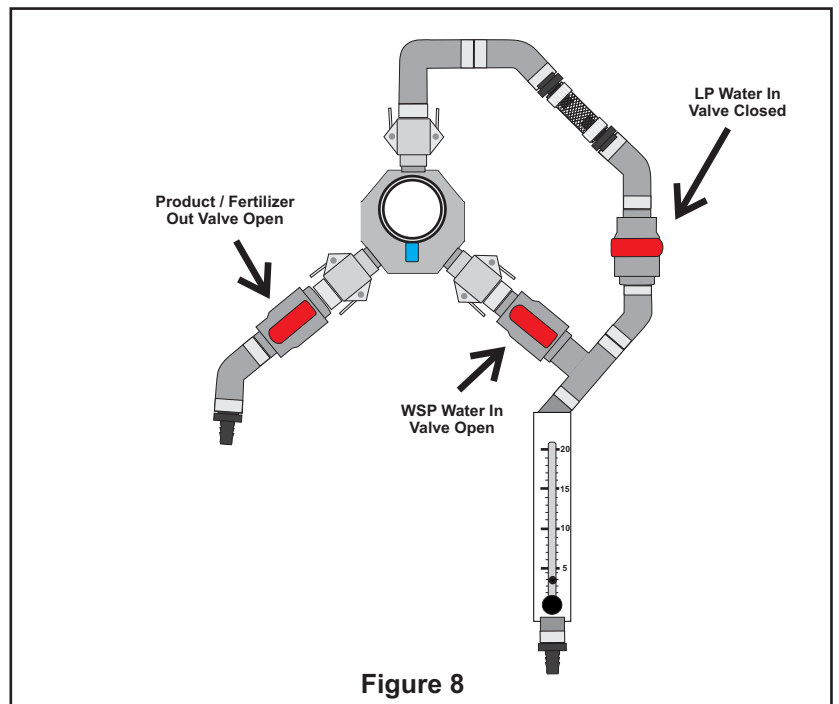
Step 1- Open the WSP Water In Valve as shown in figure 8. The valve is in the open position when the handle is in line with the valve body and piping.

Step 2- Close the LP Water In valve as show in figure 8. The valve is in the closed position when the handle is not in line with the valve body and piping.

Step 3- Open the Product / Fertilizer out valve as shown in figure 8.

Step 4- Open the two shut off valves in the mainline to allow water flow into the system and product to flow out.

Step 5- Set injection metering gauge to the desired injection rate.



if the gauge is already set, it does not need to be adjusted at time of refill.

If switching to LP from WSP, the system will inject the product on average twice as fast. This is a direct result of the LP already in suspension not requiring dissolving before injection. Reference Page 11 for “Setting The Injection Meter”

Injecting Liquid Products

The EZ-FLO has the ability to inject Water Soluble Powder products (WSP), Liquid Products (LP), or a combination of both. To change between LP and WSP products, the appropriate valve must be opened. In figure 9 below, the system is configured to deliver LP products or product that does not require mixing or agitation. This setting diverts all incoming water to a special port in the top of the tank to maximize layering of the solution to prevent dilution of the solution.

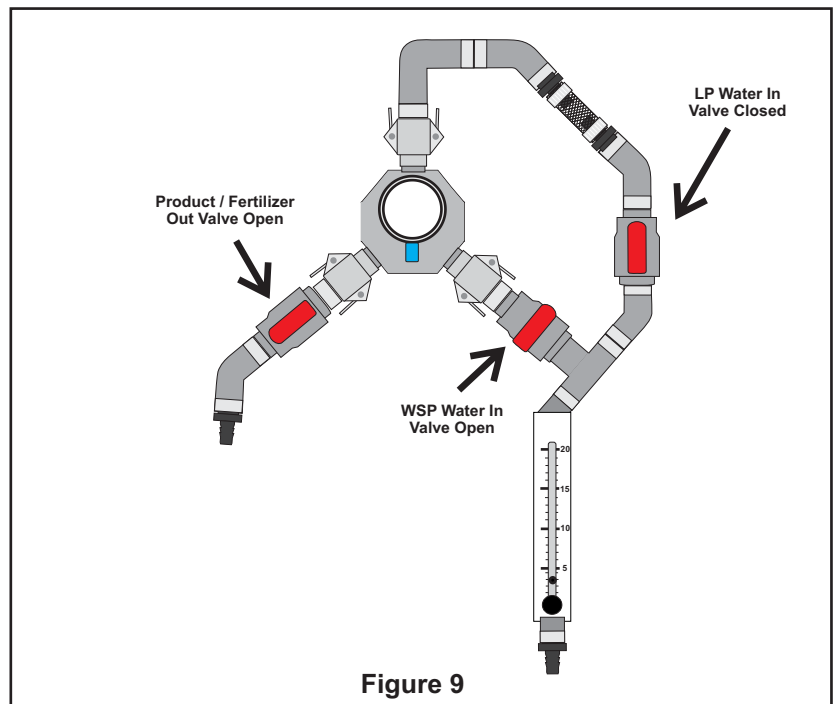
Step 1- Open the LP Water In Valve as shown in figure 9. The valve is in the open position when the handle is in line with the valve body and piping.

Step 2- Close the WSP Water In valve as show in figure 9. The valve is in the closed position when the handle is not inline with the valve body and piping.

Step 3- Open the Product / Fertilizer out valve as shown in figure 9.

Step 4- Open the two shut off valves in the mainline to allow water flow into the system and product to flow out.

Step 5- Set injection metering gauge to the desired injection rate.



if the gauge is already set, it does not need to be adjusted at time of refill.

If switching to WSP from LP, the system will inject the product on average at half the speed. This is a direct result of the WSP requiring dissolving before injection. Reference Page 11 for “Setting The Injection Meter” for additional information.

Setting the Injection Rate

Note: On the initial fill, the tank will stretch and expand for the first few minutes. When the tank has fully expanded the tank pressure will equalize with the line pressure and the feed rate can be set.

Step 1- Insure the irrigation mainline is pressurized

Step 2- Open all appropriate incoming and outgoing valves

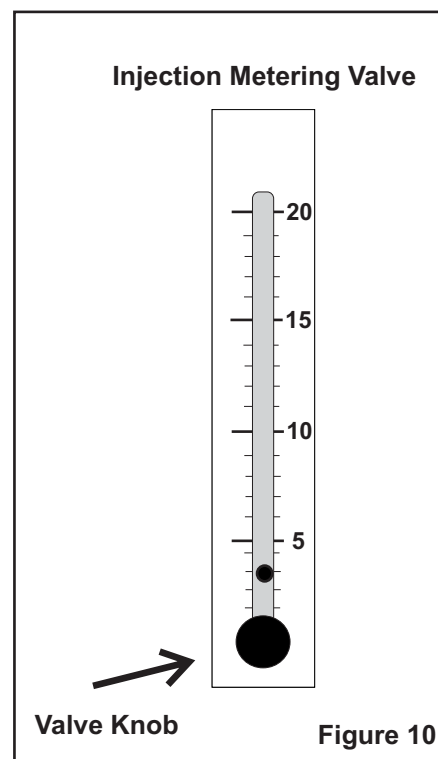
Step 3- Slowly open the injection metering valve by turning the valve knob to the left. The gauge will register the amount of water entering the tank until it is completely pressurized. Wait for the meter to drop to zero before setting the feed rate.

CAUTION: Not all valve models retain the knob and can become dislodged from the housing if opened too far. As a rule, 8 full revolutions of the knob will generally allow for it to be removed from the valve.

Step 4- Turn the irrigation system and run a zone that is the average flow rate

Step 5- Rotate the knob on the metering valve to the left until the desired gallons per hour or gallons per minute is achieved.

Note: If the gauge will not reach the desired injection rate you may need to calibrate your connection (Figure 10-1) or by-pass valve (Page 11)

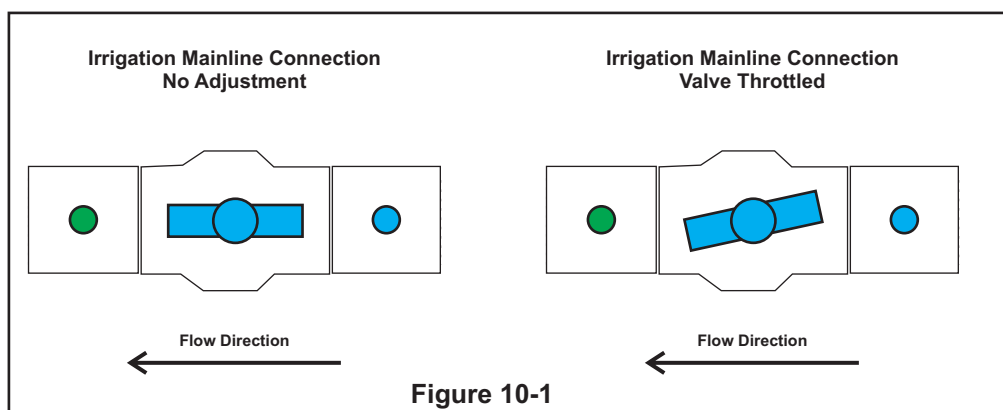


Calibration Procedure:

Step 1- Irrigation system is on and running but metering gauge is not able to inject fast enough

Step 2- Confirm the by pass valve is in the full closed position

Step 3- Slowly close the valve on the HFC (Page 4) connection or in between the SVF (Page 3) saddles until injection rate is attained.



Step 4- Adjust gauge as needed to control injection rates

Once the gauge is set, the system will automatically adjust to pressure and flow changes and there is typically no need to make additional adjustments to the gauge.

Note: The gauge is very sensitive and bouncing of the float is normal. This is caused by momentary fluctuations in pressure or flow from the mainline. The gauge will quickly return to the set position after each fluctuation.



Injection Systems

Calculating the Injection Meter Setting

Setting the system is as simple as **A-B-C**:

- A-** Know your tank capacity
- B-** Know your irrigation total run time
- C-** Know how many cycles you want to run before the product runs out (2 to 3 cycles is recommended)

This creates the EZ formula of $(A / B) / C$

Step 1- Know your tank capacity (A)

HF-045	45 gallons (LP)	450 pounds (WSP)
HF-086	86 gallons (LP)	860 pounds (WSP)

EZ-FLO manufactures the two models above but does offer custom sizes as well. Typically you only have to reference one of the above sizes for calculating the feed setting.

Step 2- Know your irrigation run time (B)

The system injection rate is set based on gallons per hour and knowing the total hours of irrigation run time will tell you how long the system will last at each setting. As a general rule, longer irrigation run times typically result in lower feed rate setting to insure the products are not completely dispensed before the end of the cycle.

Step 3- Know how many irrigation cycles you want the system to run before dispensing all of the product (C)

The typical recommendation for various products is a minimum of 2 to 3 complete irrigation cycles. You may run the system faster or slower depending on the product or landscape needs. However, EZ-FLO advises the 2-3 cycle window to achieve even coverage.

Step 4- Put the above together and figure out your desired gauge setting.

EZ Equation: Tank Capacity / Irrigation Run Time = hours to empty

Example: HF-045 = 45 gallon tank and irrigation run time of 4 hours and 3 days of running until empty.

EZ Calculation: 45 gal / 4 hours = 11.25 hours until empty, then 11.25 / 3 days or running = 3.75 GPH injection setting.

The above tells us to set the gauge at 3.75 GPH to empty the tank contents in 3 days or 3 complete cycles.

Using the same figures above, but now you want the tank to last 1 day or irrigation cycle, then you would do the following:

EZ Calculation: 45 gal / 4 hours = 11.25 hours until empty, then 11.25 / 1 day of running = 11.25 GPH injection setting

If you are to do the calculation once again, but using a 2 day watering window, the math would change as follows:

EZ Calculation: 45 gal / 4 hours = 11.25 hours until empty, then 11.25 / 2 days or running = 5.625 GPH injection setting.

Continued on Next Page

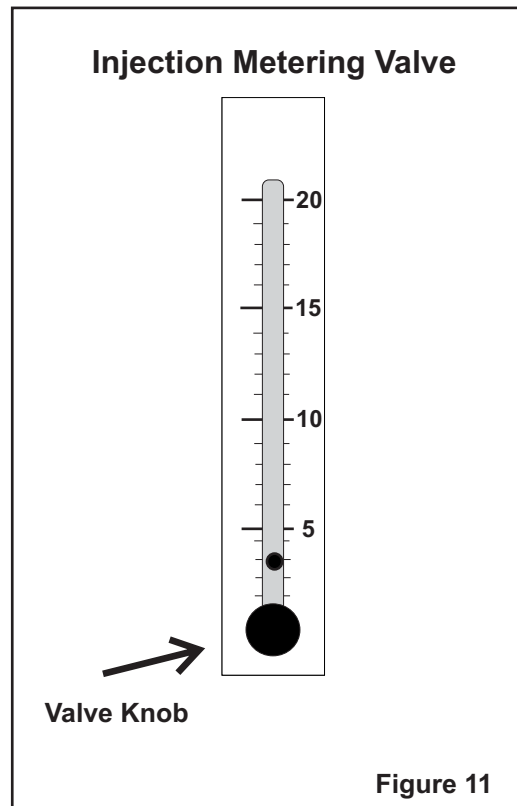


Figure 11

Calculating the Injection Meter Setting (Cont.)

Step 5- Additional considerations need to be taken into account after selecting the desired feed rate.

It is fine to round up injection rates a full half or gallon per hour. A good example is to use the above of 5.625, this can be rounded to 6 GPH and not cause any issue with the results. The majority of injectable products do not require the accuracy people tend to attempt. Generally a 10 to 20% differential is acceptable.

Allow an extra day of run time to fully clear any dyes or residual products from the tank. If you are planning to run the system for a 2 day cycle, plan to drain and refill after 3 cycles to allow for a full purge cycle.

All products are not created equal and will differ in solubility and viscosity. This may affect the ability for the system to inject the products. Typically, we do not encounter products that cannot be injected, however the rate may be slower than anticipated.

Injection of WSP versus LP:

Water Soluble Products (WSP) and Liquid Products (LP) have a very distinct difference in that the WSP is not in a readily injectable form. The WSP must first dissolve into a liquid before it can leave the injector where as a LP will immediately leave the injector. If pre dissolving a WSP or adding less than 3 lbs per gallon of total tank capacity, the product should be treated as a liquid per the below chart:

HF-045	45 Gallon Liquid Capacity	up to 135 Lbs Water Soluble Powder is still treated as a liquid
HF-086	86 Gallon Liquid Capacity	up to 250 Lbs Water Soluble Powder is still treated as a liquid

LP injects at a 1 to 1 rate, which means for every gallon of incoming water measured by the injection meter, 1 gallon of product will leave the tank. On an HF-045 system, after 45 gallons of water have passed through the injection meter, the tank will be empty of product.

WSP must dissolve and the rates will vary. The amounts of WSP added to the tank can vary greatly as well. Once above the levels listed above, you can use the ratio of 2 lbs of WSP will leave the tank for every gallon of incoming water measured by the injection meter.

Example: HF-045 with 450 lbs of WSP will take 225 gallons of incoming water to empty the tank

EZ Calculation: $450 \text{ lbs} / 2 \text{ lbs per gallon of incoming water} = 225 \text{ gallons}$

TO figure back to the gauge setting, you can use the 225 gallons as your new tank capacity.

EZ Calculation: $225 \text{ gallon capacity} / 4 \text{ hours of irrigation run time} = 56.25 / 5 \text{ irrigation cycles} = 11.25 \text{ GPH gauge setting}$

If you have any questions regarding the above, please call toll free: 866-393-5601

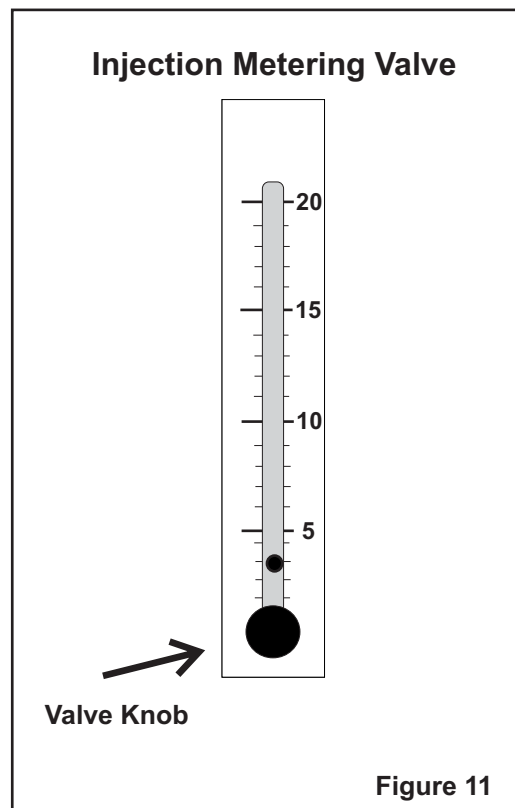


Figure 11



Injection Systems

EZ-FLO By-Pass Operation

Typically the EZ-FLO HI-FLO systems will operate perfectly fine without the use of a bypass / venturi relief valve, but if you are injecting into flow streams above 1200 GPM the valve may be required.

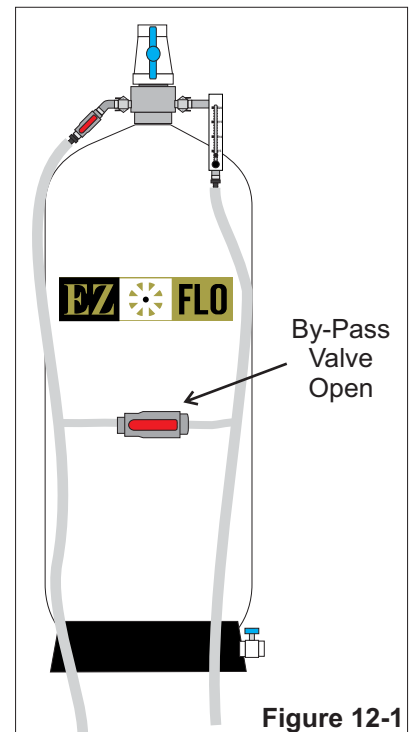
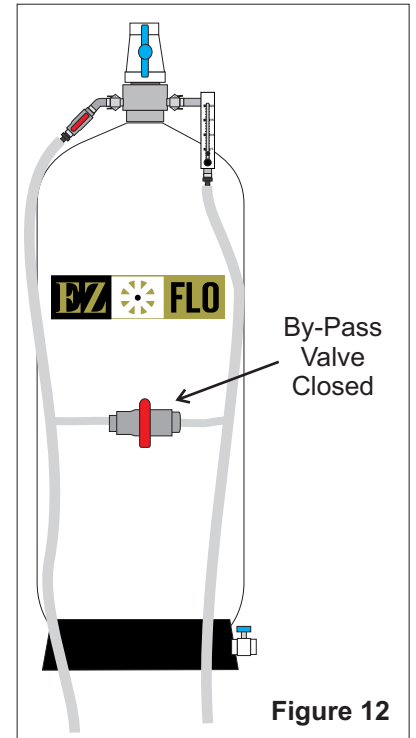
To properly calibrate and adjust:

- 1.) Make sure the tank is completely filled (fluid or supplement) so no air is present.
 - a. Purging the ½" tubing lines is not necessary as all air will evacuate automatically
- 2.) Start with the by-pass valve in the full closed position
 - a. Allow the irrigation system to reach maximum flow
 - b. The bypass valve and flow meter cannot effectively be configured at flow ranges below the maximum flow rate
- 3.) Once the mainline is operating at full flow set the flow meter to the desired feed rate
 - a. Do not adjust the bypass yet, it should still be in the full closed position
- 4.) Observe the flow meter float and its ability to maintain the set level for a period of 2 to 3 minutes.
 - a. The float will bounce due to fluctuations in pressure but quickly recover to the selected setting, this is normal operation.
 - b. Continue to observe and confirm the float is returning to the appropriate level and not steadily dropping
- 5.) If the float continues to return to the appropriate level and the irrigation system is operating at full flow, no adjustment needs to be made to the bypass valve.
- 6.) While observing, if the float fails to return to the appropriate level and steadily to lower levels the bypass valve will need to be opened
 - a. When the float steadily drops, increase the observation time to 5 minutes to insure it does not recover
- 7.) To adjust the bypass valve, simply turn the valve to the full open position.
 - a. This will instantly relieve the turbulence in the venturi fitting
- 8.) Once in the full open position, set the injection meter to the desired feed rate and observe for 5 minutes

- 10.) Now the flow meter may be set to the desired level of injection
The bypass valve is now configured and if the bypass valve is ever accidentally adjusted the above steps may be repeated.

Special notations:

If the bypass valve is too far open, the system will lose the ability to inject at higher rates. Depending on the desired level of injection, this may not be an issue. When the bypass valve is too far closed, the injection may suddenly stop.



To Fill The Tank with Product

The EZ-FLO HI-FLO system may be filled with virtually any liquid (LP) or water soluble product (WSP) in full concentrated form. No premixing or dilution is required although it may be applicable in high coverage rate products. Water soluble products may be easier to pour into the tank if premixed into a slurry or flow-able paste.

Tank Capacities:

HF-045	45 Gallons (LP)	450 Pounds (WSP)
HF-086	86 Gallons (LP)	860 Pounds (WSP)

Step 1- Confirm all valves are closed and the tank is empty or enough fluid has been removed to allow for the addition of the new product. If filling to maximum capacity all fluid should be drained through the purge valve (Figure 13)

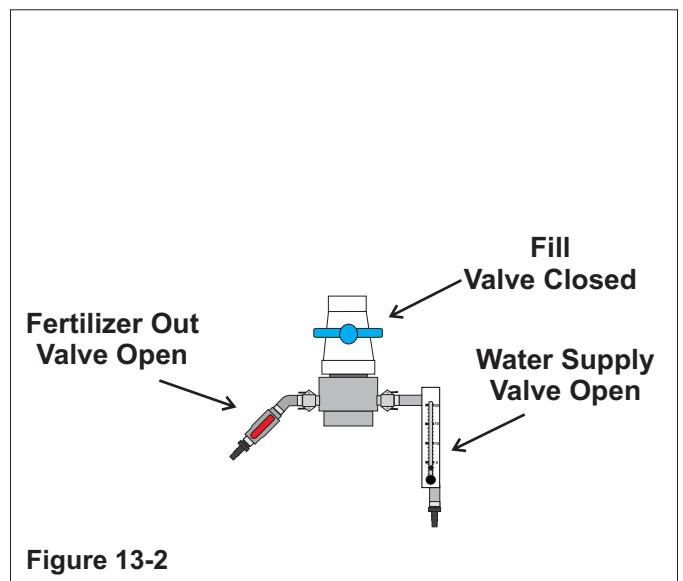
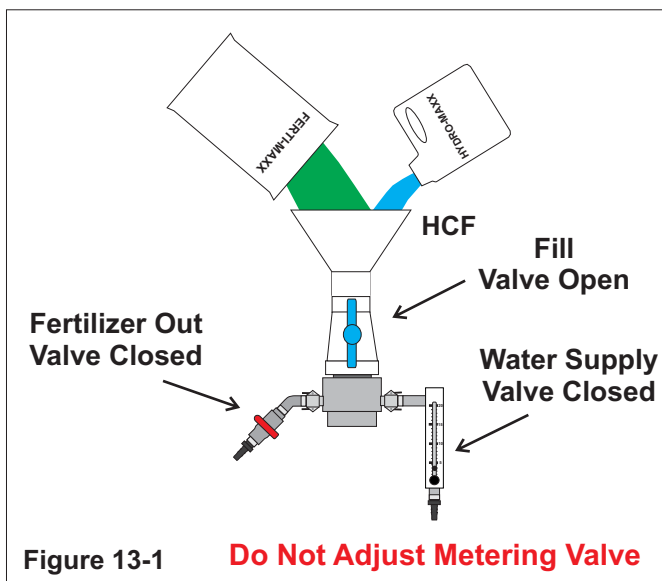
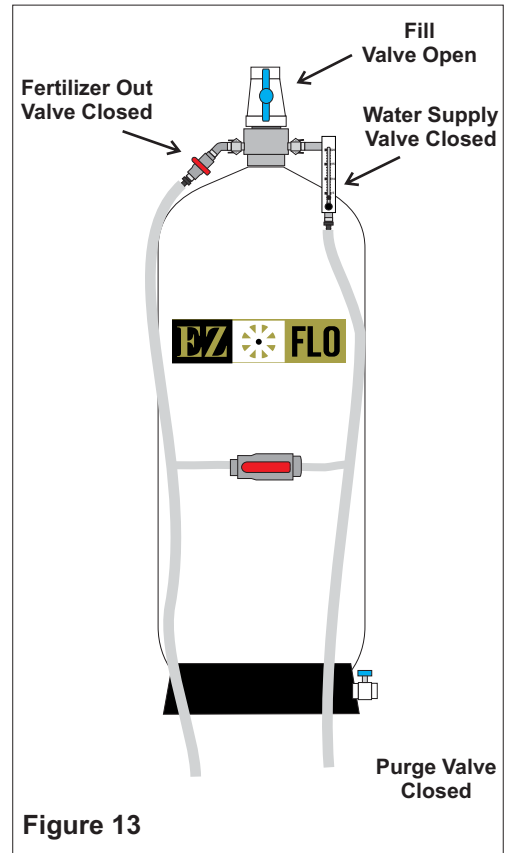
Do not close or adjust the injection metering valve, this will unnecessarily change your injection rate.

Step 2- Open the fill valve and attach the High Capacity Funnel (HCF, Optional) (Figure 13-1)

Step 3- Add the desired amount of products (Figure 13-1)

Step 4- Top off with water and close the fill valve (Figure 13-2)

Do not leave air in the tank, this will delay injection and may cause damage to the system and its components.



Note: The system will always have 1 quart to 1/2 gallon of dyed material or residual product at the time of draining. This is due to the location of the dip tube assembly and materials sitting in the drain. The product may be saved and added to the next batch without issue.