



Drip Irrigation Kit Installation Manual

Gravity Feed Drip Irrigation Kit for Dirty Water



Models:

- Starter Kit: 20 Plants (DK-GFDW-S)
- Medium Kit: 30 Plants (DK- GFDW-M)
- Large Kit: 50 Plants (DK- GFDW-L)



Starter Kit

Medium Kit

Large Kit

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Description

This kit contains everything you will need to go from rain barrel (not included) to your plants, including a rain barrel bulkhead fitting. **The kits in this group use 1/4" Adjustable Flow Control valves instead of emitters.** The larger opening in flow control valves is less likely to clog from debris in the water. Turn the knob to "dial-in" the flow rate to individual plants. The number of plants that can be watered with each kit is an estimate based on the total number of Flow Control valves provided in the kit. Larger plants should get at least two valves.

Barbed valves are designed to attach directly to the 1/2" drip tubing or to the end of 1/4" micro tubing. The number of plants that can be watered with each kit is an estimate based on the total number of valves provided in the kit. Larger plants should get at least two valves. A rain barrel bulkhead fitting is included to turn a garbage can, bucket, or barrel into a rain barrel.

A Hose End Timer (DD-HEDT) can be purchased separately.



Hose End Timer

About Gravity Feed Drip Systems

Drip irrigation products are designed for use with constant pressure of 15 - 30 psi. The stated output for drip emitters (drippers) is based on this pressure. For example, the 1/2 gph emitters in most kits will deliver one half-gallon of water per hour if the system is pressurized at 15 psi.

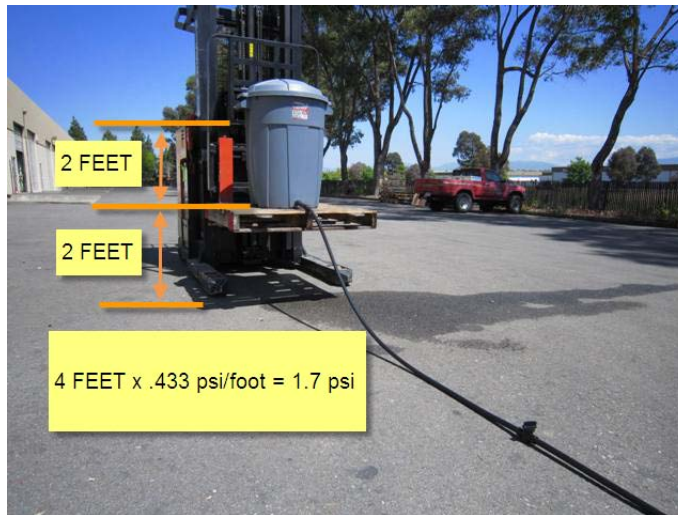
Since the pressure with a gravity system is often well below this range, and drops as the system operates, emitter flow rates will be substantially less than those specified for the individual emitter. This kit uses 1/4" flow valves instead of drip emitters but the flow rate will also vary between valves on the same line of drip tubing as they are placed farther away from the water source.



Drip Emitter Output drops down the line

In a nutshell, a **gravity-fed drip system will distribute water inconsistently throughout the system.**

To determine the water pressure in a gravity feed drip system, measure the height of the water in the rain barrel or tank to the ground.



Rain Barrel at 2 foot elevation

If the rain barrel is on a hill above the plants to be watered, measure the height of the barrel above the planted area. You gain .433 psi for each foot of elevation. For example, if you fill a 2 foot garbage can (or rain barrel) with water, the pressure is less than 1 psi (.866 psi). As the water level drops in the barrel, so does the pressure. The output of the drippers will drop as the water level drops.

At very low pressure, it may take several hours to deliver the amount of water needed for your plants. For example, if a dripper emits 1/8 of a gallon of water per hour with a rain barrel 3 feet above the ground, you need to run your drip system for 4 hours in order to deliver 1/2 gallon of water to your plants.



Rain Barrel with drip tubing

To achieve the recommended 15 psi (and 1/2 gph output) your rain barrel would need to be 34.6 feet above your plants.

If you are willing to accept very low and uneven water output, you can build a gravity-feed system for watering plants with a container on grade or just a few feet off the ground.

We have done extensive testing with our drip kits in multiple configurations in order to provide you with the best recommendations. Our goal is to help you build a gravity-feed drip system with the most consistent drip output.



Drip Irrigation Testing at Irrigation Direct

Gravity Feed Guidelines

These guidelines are included to help you achieve the most consistent water output from each of the drip flow control valves. It might not be practical for you to follow each of these guidelines with your particular landscape or garden layout. The more of these guidelines that you incorporate into the design of your gravity feed drip system, the more consistent output you will achieve.

1. **Output drops off down the line as you move farther away from the supply line.** The graph below shows the output for a single line of Flow Control valves (DD-FCV250) attached to a rain barrel (Starter Kit). In this example, the rain barrel is installed 2 ft above the ground and filled with 2 ft of water. Ten Flow Control valves were spaced every 24 inches along the 1/2" drip tubing (20 feet total). As you can see below, the individual output decreases toward the end of the drip tubing.

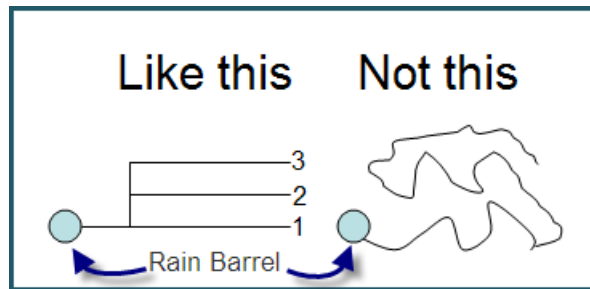
**Gravity Feed Drip Irrigation Kit for Dirty Water - Starter Kit
FCV250 Flow Control Valve Output (gph)**



Flow Control Valves (FCV250) --- Rain Barrel @ 2 ft elevation

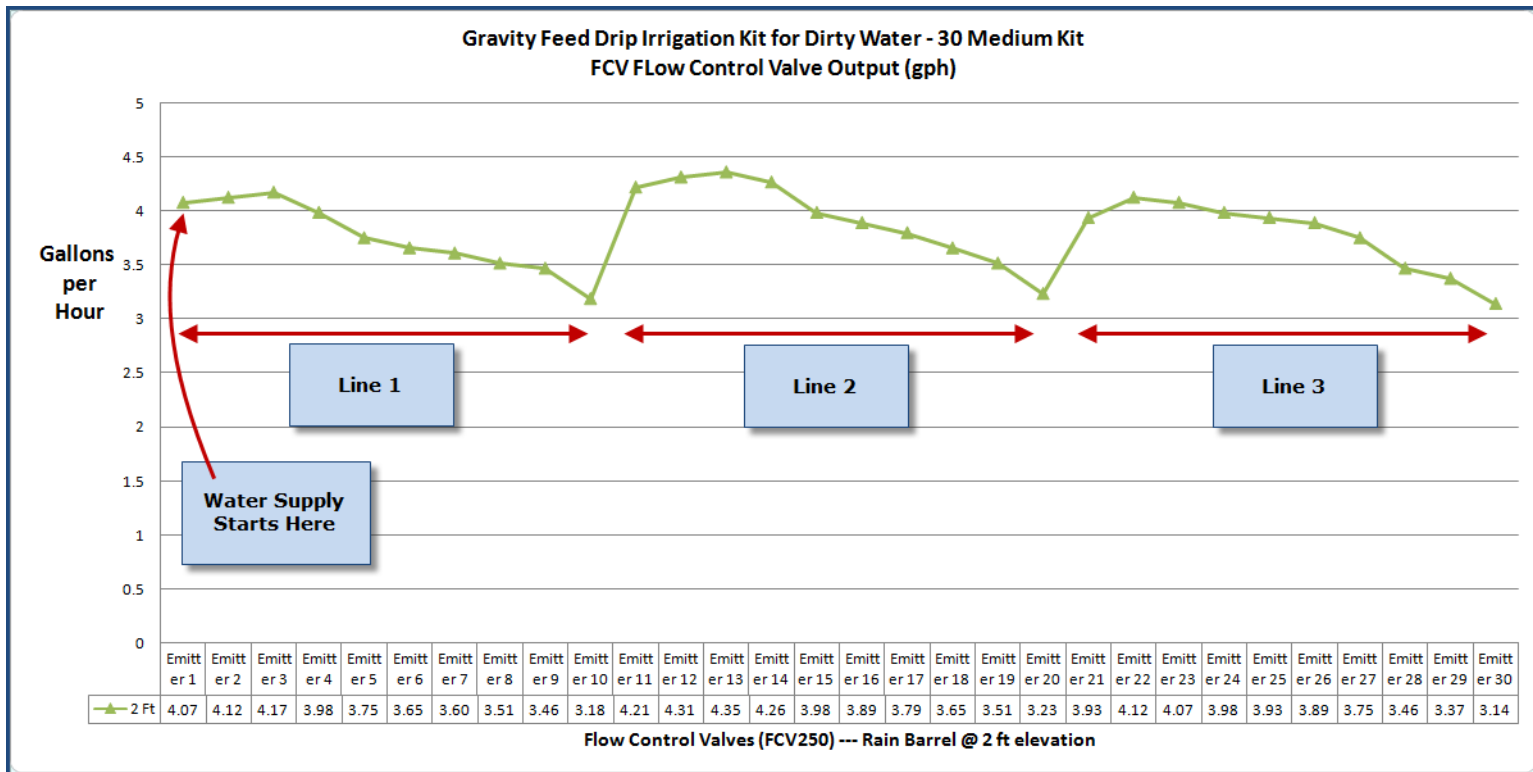
Single 20 foot length of drip tubing - Mainline attached at end

- Use short drip tubing runs & a grid layout.** You will get better results with grid layouts of short tubing lengths (20 ft or less) than with a long snaking drip tube.



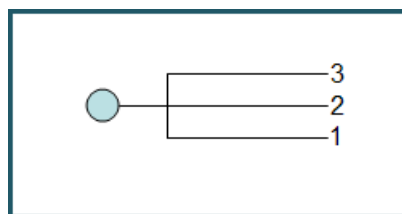
Blue circles are rain barrels

The chart below shows how the installation of short rows will reduce output variance. This example results for three 20-foot rows. The rain barrel is installed 2 ft above the ground and filled with 2 ft of water. Each 20-foot line of drip tubing has ten Flow Control valves spaced every 24 inches from beginning to end (30 total valves). Water supply is connected next to Line #1. If the total distance was covered by a single "snaking" line of drip tubing, you would see a large drop in water output between the first and last valve on the line (like the graph above).



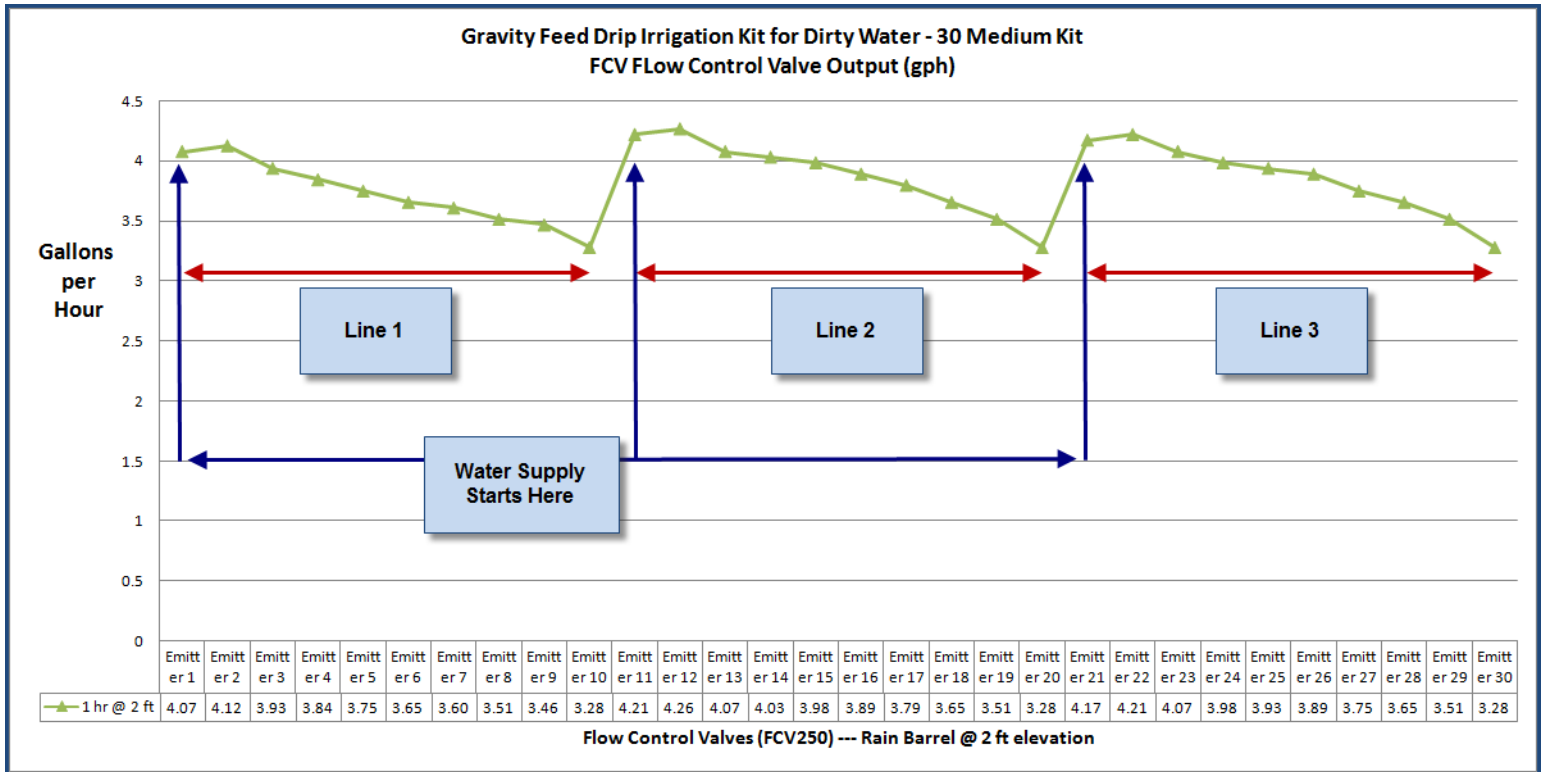
Three rows of drip tubing - Mainline attached near end of line #1

3. **Connect mainline to the center of the row to create a more even distribution.** By splitting the distance between lines # 1 and #3 you can even out the water output along the drip line.



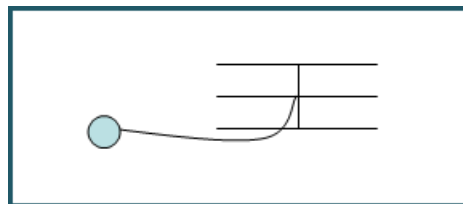
Rain Barrel & 3 rows of drip tubing

In the chart below, notice how the output is increased throughout the system and the output is relatively even between all of the valves. The rain barrel is installed 2 ft above the ground and filled with 2 ft of water. Each 20-foot line of drip tubing has ten drip Flow Control valves spaced every 24 inches from beginning to end (30 total valves). Water supply is connected at the end/center of the grid next to Line #2.



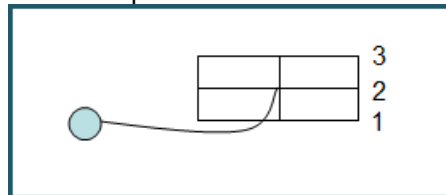
Three rows of drip tubing - Mainline attached in center near end of line #2

Another option is to attach the mainline to the center of the grid, like this:



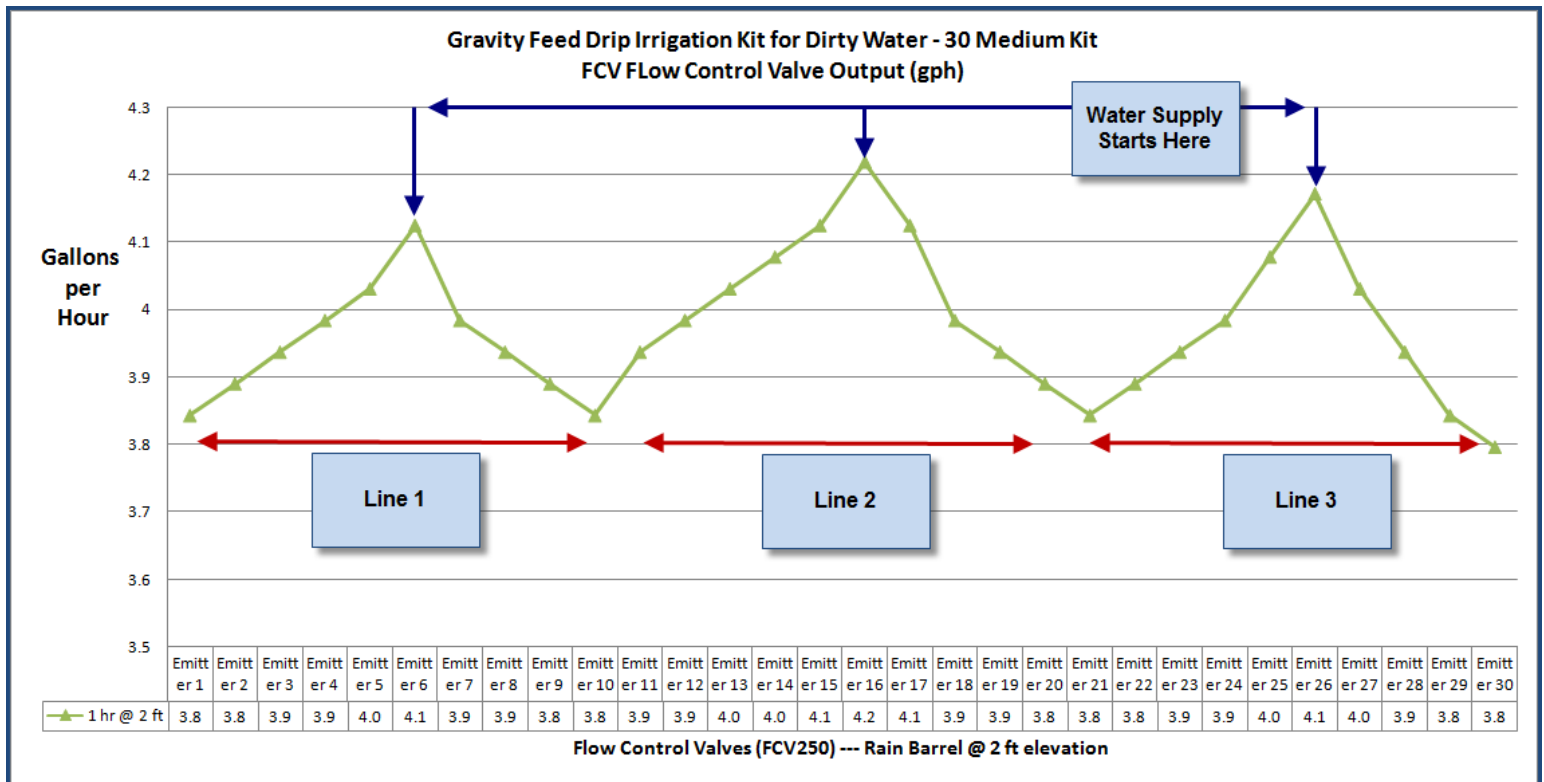
Mainline attached in center

4. **When installing multiple rows, connect the ends together to further reduce the variance in water distribution.** Our research shows that by connecting the ends of the drip tubing you can improve the pressure in the line and lessen the drop in flow rate.



Mainline in center - closed drip tubing ends

In the chart below, there is even less variance in drip output (vs. the previous example). The rain barrel is installed 2 ft above the ground and filled with 2 ft of water. Each 20-foot line of drip tubing has ten Flow Control valves spaced every 24 inches from beginning to end (30 total valves). Water supply is connected in the center of the grid next to Line #2.



Three rows of drip tubing - Mainline attached in center near line #2 - closed drip tubing ends

Installation: Overview

The Bulk Head Fitting (DD-BHF75) comes with an instruction sheet called "Installing a Bulk Head Fitting in a Rain Barrel". You will attach a Y Filter and Swivel Adapter to the Bulk Head Fitting. The supply line is 1/2" Solid Drip Tubing and is run next to your landscape or vegetable garden plants. A 1/2" Flow Control Valve is used to control the water flow from the rain barrel to the plants. Small plants will get one 1/4" flow control valve. Larger plants should get two 1/4" flow control valves. Trees will likely require 4 or more valves. We've included stakes for the 1/4" tubing. You may purchase 1/2" stakes separately.

Installation: Step-by-Step

Roll the tubing out in the sun to soften. Weigh it down and let the sun heat the tubing. This will make it easier to work with.

Step one: Installing the Bulk Head Fitting



Follow the instructions to install the enclosed bulkhead fitting. *If your rain barrel has a bulkhead fitting attached, skip to Step Two.*

Step Two: From the Rain Barrel to the Individual Plants

1. Attach the **Y Filter** (DD-YS75HFM) to the male hose threads of the bulkhead fitting.



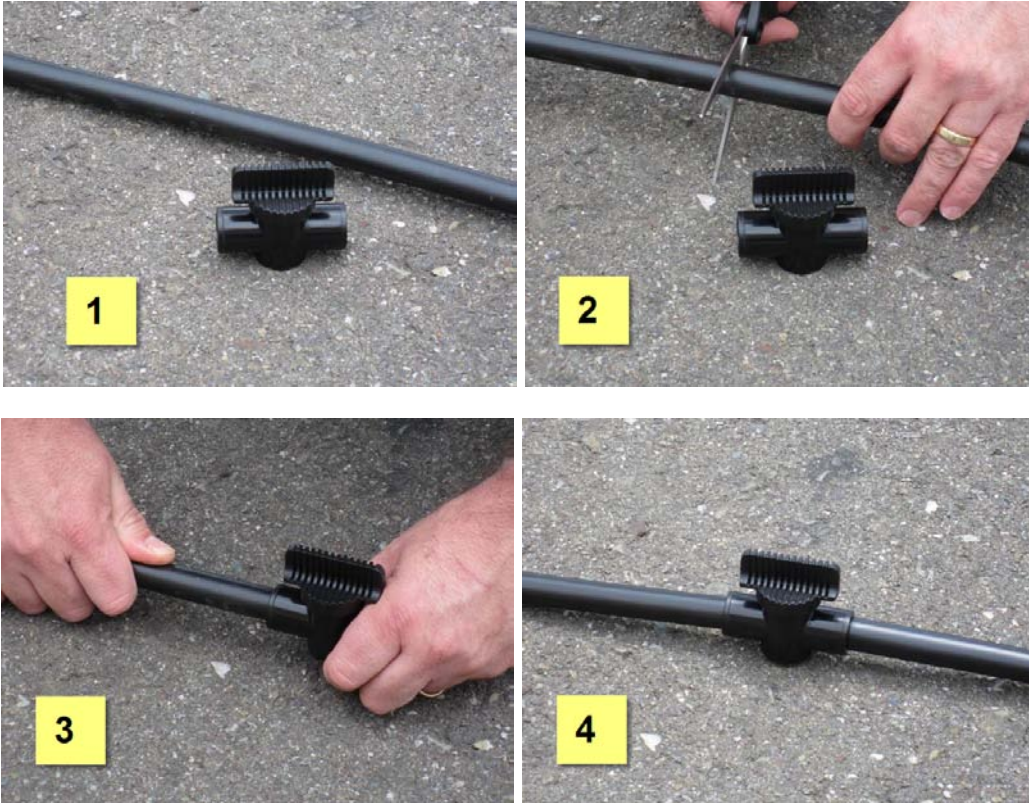
2. Screw the **Direct-Loc Swivel Adapter** (DL-FHS600) onto the hose inline filter.



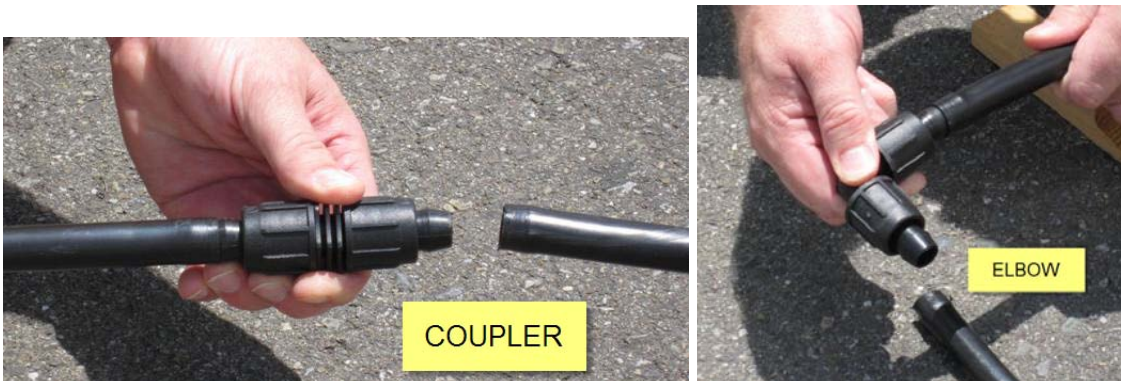
3. Attach **1/2" Drip Tubing** (DD-DH700) to the 1/2" swivel adapter and run it to your plants. It's a good idea to run it as close to each plant as possible. **Layout tips:** Read the [Gravity Feed Guidelines](#) above for tips on laying out your drip system for best output performance.



4. Add the **1/2" Flow Control Valve** (DD-FCV-700) in a convenient location after the swivel adapter. This is the "on/off switch" for your gravity-fed drip system. Just cut the 700 poly tubing and insert the flow control valve like a coupler (see below).



5. Use **1/2" Direct-Loc Tees (DL-T600)**, **Couplers (DL-C600)**, and **Elbows (DL-L600)** to create lateral lines and watering grids as needed.



Gravity Feed System Layouts

Here are a few sample layouts for our gravity feed kits. Use the tips below in your design to help equalize the output.

Starter Kit Connection Options

Starter Kit

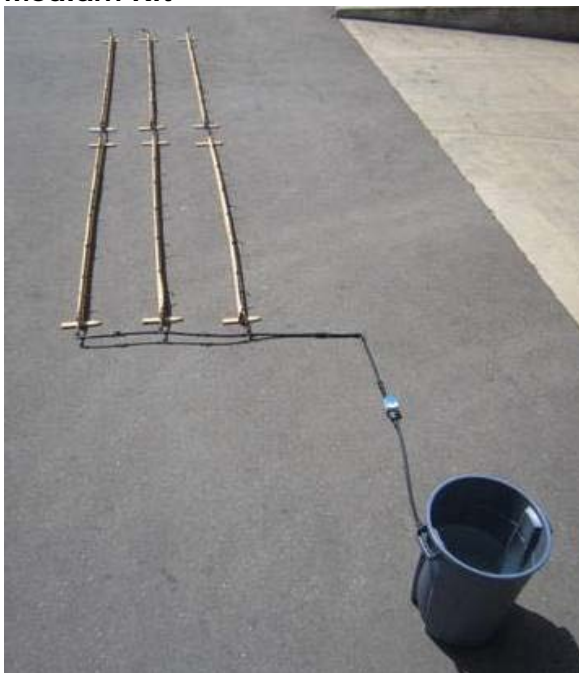


Tip: Attach mainline to center for better water distribution



Medium Kit Connection Options

Medium Kit



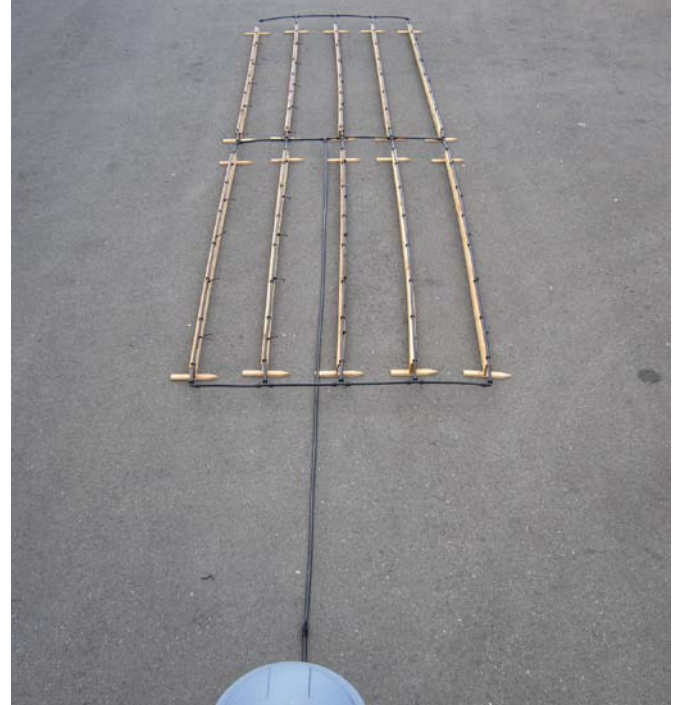
TIP: Close off the ends and attach mainline to center



Large Kit Connection Options

Large Kit

TIP: Close off the ends and attach mainline to center



6. Add **Direct-Loc Threaded End Caps** (DL-EC600) to the ends of 1/2" drip tubing. Leave the caps off for flushing.



7. Open the Flow Control Valve to turn on the water and **FLUSH THE LINE** until all lines are clear of debris. Replace the 1/2" threaded end caps at the ends of the 1/2" drip tubing.



Step Three: Installing Flow Control Valves

1. At each plant use the **Deluxe Hole Punch** (DD-HP250) to poke a hole in the 1/2" tubing.



2. Insert the **1/4" Flow Control Valve** (DD-FCV250) directly into the 1/2" tubing.

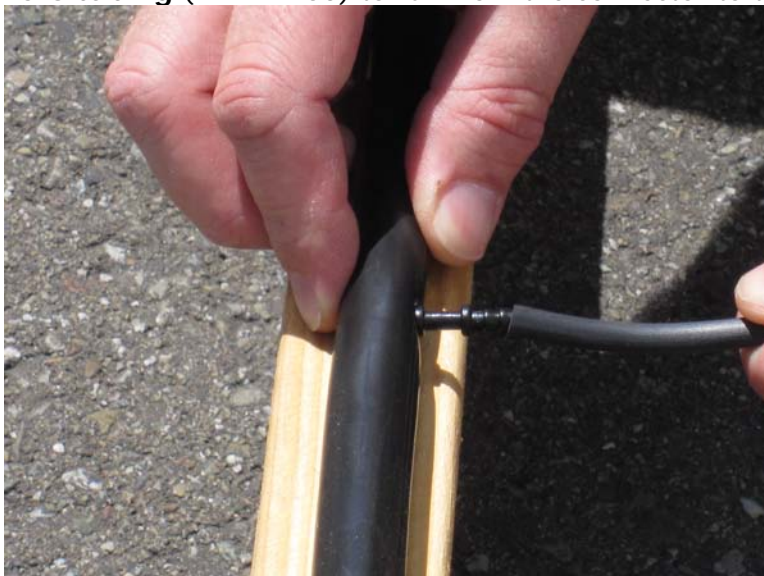




3. If the plant is not next to the 1/2" tubing, insert a **1/4" Connector** (DD-C250) into the 1/2" tubing.



Add a piece of **1/4" solid micro tubing** (DD-DH250) to run from the connector to the plant.



Cut the tubing with scissors and push the **1/4" Flow Control Valve (DD-FCV250)** into the open end of the 1/4" tubing.



Stake it next to the plant with a **Micro Tubing Stake (DD-S2)**.



4. Turn on your system and check each valve for water output. Remember that some inconsistency of output is to be expected with a gravity-fed drip system.

- **Goof Plugs** (DD-GP) are used to plug holes in 1/2" drip poly tubing or cap off 1/4" micro tubing.











- The **Direct-Loc Coupling** (DL-C600) can be used to connect 1/2" solid drip tubing or for repairs in 1/2" tubing that goof plugs can't handle.



Parts List

	ITEM	Quantity			PART #
		S	M	L	
	<p>Bulk Head Fitting Provides a threaded connection from the rain barrel (bucket) to your gravity feed drip irrigation kit. Requires a 7/8" hole saw (not included). Installation instructions included.</p>	1	1	1	DD-BHF75
	<p>Y Filter with hose threads Installed between the hose vacuum breaker and the drip regulator. Protects flow control valves from impurities that may clog them. 150 mesh screen.</p>	1	1	1	DD-YS75HFM
	<p>Direct-Loc Swivel Adapter with hose threads Connects 1/2" drip tubing to rain barrel bulkhead fitting. Connects to 3/4" male hose threads. Convenient removable fitting.</p>	1	1	1	DL-FHS600
	<p>1/2" Drip tubing (700 series) - 50 foot roll 1/2" tubing for main lines. Supplies water to 1/4" micro tubing (lateral lines) and drippers.</p>	1	1	-	DD-DH700-50
	<p>1/2" Drip tubing (700 series) - 100 foot roll 1/2" tubing for main lines. Supplies water to 1/4" micro tubing (lateral lines) and drippers.</p>	-	-	1	DD-DH700-100
	<p>1/2" Flow Control Valve Adjust or stop the flow of water through 1/2" drip mainline tubing. Handy when isolating irrigated sections. This is the "on/off" valve for your gravity feed system.</p>	1	1	1	DD-FCV700
	<p>Direct-Loc Tee Used to branch off and create lateral lines off of mainline drip tubing. Convenient removable fitting.</p>	1	2	4	DL-T600
	<p>Direct-Loc Coupling Used to connect 1/2" solid drip tubing or for repairs in 1/2" tubing that goof plugs can't handle. Convenient removable fitting.</p>	1	2	3	DL-C600
	<p>Direct-Loc Elbow Used to make 90 degree turns in 1/2" drip tubing. Convenient removable fitting.</p>	1	2	3	DL-L600

	Direct-Loc Threaded End Cap Caps off the ends of 1/2" drip tubing. Threaded Cap allows for easy flushing and draining in winter. Convenient removable fitting.	1	2	4	DL-EC600
	Deluxe Hole Punch Designed to fit very comfortably in your hand. Creates clean, precise holes in 1/2" drip poly tubing.	1	1	1	DD-HP250
	1/4" Flow Control Valve Watering device for individual plants in this gravity feed kit. Adjustable flow rate. Barbed ends easily insert into 1/4" drip tubing or into 1/2" tubing (with hole punch).	20	30	50	DD-FCV250
	1/4" Connector - barb x barb Used to connect 1/4" solid drip tubing or 1/4" soaker hose to drip mainline tubing. Connects lengths of 1/4" tubing.	20	30	50	DD-C250
	1/4" Drip micro tubing - 50 foot roll 1/4" micro tubing for lateral lines from 1/2" main line tubing to plants.	1	-	-	DD-DH250-50
	1/4" Drip micro tubing - 100 foot roll 1/4" micro tubing for lateral lines from 1/2" main line tubing to plants.	-	1	1	DD-DH250-100
	Micro Tubing Holder Stake - 6" Keep drip emitters and micro tubing in place. Emitter and micro tubing is elevated, reducing dirt and insect intrusion.	20	30	50	DD-S2
	Goof Plug Plug holes in 1/2" drip poly tubing or cap off 1/4" micro tubing. Dual plug ends to accommodate large or small holes.	10	10	20	DD-GP

Maintenance Tips

WINTERIZING

If you live where it freezes, it is a good idea to drain the water from your drip lines and the components connected to the water source. Here's how:

1. Turn off the hose bibb.
2. If you have a hose-end timer installed, let the system run through a watering cycle. This will open the timer and let any remaining water drain out of the timer and other components & into the drip tubing.
3. If you do not have a timer installed, unscrew the drip system from the hose bibb for a few minutes to let air into the line. Reattach the line after a minute or two.
4. **Note:** *We do not recommend blowing compressed air through a drip system.*

FLUSH THE LINE ANUALLY

Since drip systems operate at low pressures, sediment can settle in the line over time.

1. Flush the line annually by unscrewing the end cap at the end of the line.
2. Check filter screen for debris and clean if necessary.
3. Turn on the hose bibb until the water runs clear from the end of the line.
4. Replace the cap.
5. Turn on the hose bibb and check the entire system for leaks.

REPAIR BREAKS & LEAKS

1. Small holes in the line can be plugged with a goof plug.
2. For larger breaks or holes in the 1/4" drip tubing, make a clean cut around the damaged area and reconnect the lines with a **1/4" barbed connector** (DD-C250) *purchased separately*.
3. For larger breaks or holes in the 1/2" drip tubing, make a clean cut around the damaged area and reconnect the lines with a **1/2" Direct-Loc coupling** (DL-C600).

DRIP IRRIGATION TUTORIALS

Visit our website for more tips, tricks, and expert advice: <http://www.irrigationdirect.com/expert-advice>

Irrigation Direct Limited Warranty

Irrigation Direct warrants to the original purchaser that the Irrigation Direct Product(s) is/are free from defects in material and workmanship under normal use and service.

The warranty coverage lasts for a period of three (3) years starting from the date of purchase. For details visit the warranty page on our website: <http://www.irrigationdirect.com/warranty>

The Irrigation Direct Guarantee

Our 100% satisfaction guarantee ensures that every item you purchase at Irrigation Direct meets your high standards—or you can return it for a replacement or refund. We want you to buy with confidence anytime you purchase products on the Irrigation Direct website. If you're ever dissatisfied with an item, contact us to return or exchange it.

Contact Information

Product Questions:

If you have a question about our products, first make sure that you have clicked "click for details" on our website on the product that you have a question about, chances are you will find all kinds of great details and even videos Or email us at: productquestion@irrigationdirect.com.

Installation & Maintenance Information:

If you have a question that you couldn't find the answer for in this instruction sheet, please check the following sections of our website:

Expert Advice: www.irrigationdirect.com/expert-advice

Tutorials: www.irrigationdirect.com/expert-advice/tutorials

Videos: www.irrigationdirect.com/expert-advice/videos

Technical Support: techsupport@irrigationdirect.com

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