

FOLLOW THE OUTDOOR WATERING SCHEDULE

The outdoor watering schedule changes seasonally. For a current schedule, go to www.fresno.gov/water.

To report water waste, or learn about our free landscape consultation services, call the City of Fresno Water Conservation program at **(559) 621-5480**.

You can also email us at waterconservation@fresno.gov.

The City of Fresno thanks you for your cooperation in conserving water.



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DRIP IRRIGATION

A Guide To **INSTALLATION AND MAINTENANCE**



Saving Water **DRIP BY DRIP**

Drip irrigation is the most efficient method of watering plants, saving you time, money and water. Check with your local home improvement store, nursery, or irrigation supply store for a full selection of drip irrigation supplies.

GETTING TO THE ROOT OF *Efficient Irrigation*

Drip irrigation has been practiced in one form or another since ancient times when buried clay pots were filled with water, which would seep deep into the root zone of trees and plants.

The advent of plastic, however, took drip irrigation to a whole new level, making it commercially viable and transforming it into one of the most efficient irrigation delivery methods of modern times.

By delivering water slowly to the roots of plants, drip irrigation systems allow water to penetrate deep into the root zone, drastically reducing water waste caused by evaporation, runoff, wind, or overspray onto unintended areas.



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PROS & CONS OF *Drip Irrigation*

As with any irrigation method, drip systems have advantages and disadvantages. However, as more cities, like Fresno, meter residential water use, it's clear the pros of drip irrigation outweigh the cons.

Advantages

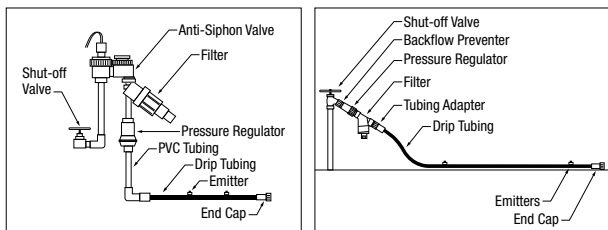
- Conserves water by delivering water only where needed
- Mitigates soil nutrition loss
- Distributes water in a highly uniform way
- Reduces soil erosion and potential water runoff
- Easy to design and install
- Eliminates staining on house siding, pavement, and wood fences
- Relatively inexpensive
- Allows for irrigation of irregular-shaped areas
- Flexible
- Allows for easy expansion or design changes
- May be concealed to maintain the beauty of the landscape
- Allows fertilizer to be applied with minimal waste
- Keeps foliage relatively dry, reducing the risk of disease
- Reduces weed growth between plants
- Can be operated at lower pressure than other types of irrigation

Disadvantages

- Regular maintenance is recommended and repairs may be necessary
- Subject to damage by rodents, insects, pets, and humans
- Improper filter and/or maintenance can lead to clogged emitters
- Not ideal if herbicides or top dressed fertilizers need sprinkler irrigation for activation
- High efficiency means little or no leaching, which can lead to salinity issues

LET'S GET *Started*

Before you install a drip system, you'll first need to identify your water source. Drip irrigation can be connected to an existing sprinkler system or attached to a standard outdoor water faucet. Regardless of which water source you select, you should install a filter and pressure regulator downstream of the valve.



Drip irrigation connected to an existing sprinkler system.

Drip irrigation attached to a standard outdoor water faucet.

If using a garden hose faucet, first install a backflow preventer between the faucet and the drip system. Then, install a pressure regulator, filter, and tubing adapter before installing the drip tubing. Lay out the drip tubing in a pattern that will service all of the plants in this zone, using drip irrigation fittings if necessary to get the tubing where it needs to be without kinking the tubing. You are now ready to install drip emitters unless the tubing came with pre-installed emitters.

If you're changing a sprinkler-based system, be sure to convert the entire sprinkler zone to drip, as sprinklers and drip operate at different pressures and run different lengths of time. Connect a filter and pressure regulator to the existing anti-siphon valve, then lay out the drip tubing in a pattern that will service all of the plants in this zone, using drip irrigation fittings if necessary to get the tubing where it needs to be without kinking the tubing. Once you have laid out your tubing pattern:

- Cap off the sprinkler risers that are not needed, keeping a few to use for connecting your drip system.
- Connect a threaded PVC "T" connector to remaining risers. To make it easier to handle, warm the tubing by leaving it out in the sun prior to installation. This will make it more flexible and easier to straighten when installing.
- Connect your drip line into the "T" and run the line among the plants where you need to water.

- Once the line is on the ground, punch a hole for each emitter using an emitter hole punch. As a general guide, plants need two emitters – one on each side of the trunk. For established shrubs, place the emitters about one foot away from the trunk and the second about two to three feet away from the first. For established trees, place emitters in a circle at the edge of the canopy.
- Check your system by sticking a screwdriver into the soil between emitters to see if moisture is present. If the soil is moist, the screwdriver will slip easily into the ground, which is what you want.
- At the end of the drip line insert a "figure eight" end cap. If your drip is on a slope, insert an air vent at the highest point in the line.

It is helpful for future use to map out on paper the areas you have converted from spray to drip irrigation.

Monthly Inspections

Make sure your maintenance program for the landscape includes a monthly inspection of all drip irrigation stations. The drip system should be inspected while in operation. If you are using a large number of drip stations, you may want to spot check or use an inspection rotation, but keep inspections as frequent and complete as possible. As with all irrigation inspections, look for water bubbling out of the ground or a jet of water spouting out of the drip tubing as an indicator of a leak or line break. Wilting or dead plants may indicate a clogged emitter.

To Cover Or Not To Cover

If you don't like seeing the drip line, you may choose to conceal the tubing with a thick layer of mulch. Drip irrigation systems left above ground tend to clog less than buried systems, and they are easier to lift out of the way when cultivating or planting. If you do bury your system, it is helpful to draw a diagram of it, so you won't forget where it is and what type of components you used.



COMPONENTS OF A *Drip System*

The components you need may vary depending upon the landscape of your yard (hilly, flat, sloped, etc.), as well as how you choose to configure your system. The following information provides some of the most commonly used components in a drip system.

Valves

Emergency Shut-off Valve: Installed at the point of connection to the water source where the irrigation system is being placed, this valve allows for a complete shut off of water to the irrigation system when repairs are needed.

Zone Control Valve: Allows the water to flow from the point of connection to the irrigation tubing. These valves are either manual (hand controlled) or automatic, which is controlled by a timer through a solenoid. A Pressure Vacuum Breaker (PVB), or anti-siphon valve is necessary when using a well or municipal water source. Most control valves come with a PVB or anti-siphon valve attached per the picture above. If you're connecting your system directly to a faucet, you will only need the Backflow Preventer. These devices keep water that potentially carry fertilizers or chemicals from entering back into the main system. Valves should be installed six to twelve inches above ground level.



Filters

There are different kinds of filters – disk or screen – but all function to stop small particles in the water from traveling into the drip system and clogging emitters. Each manufacturer recommends different levels of filtration for their products, but normally 150 micron or 100 mesh or higher is best. The better the filter, the less time and money spent on unclogging emitters or repairing particulate damage. Filters are installed after the control valves, but before the drip tubing connection.



Pressure Regulator

Pressure regulators reduce the water flow through the irrigation system. Drip systems operate on low pressures with 20 to 30 psi being the industry standard. The pressure regulator is installed either before or after the filter, prior to the drip tubing.



Drip Tubing

Drip tubing is a thin-wall polyethylene tube with a low-pressure rating that is laid on the ground between plants. Emitters need to be installed unless tubing with pre-installed emitters was purchased.



Emitters

Emitters control the rate at which water drips out onto the soil. The most common rate is one gallon per hour. You can purchase drip tubing with emitters already embedded in the tubing or install them yourself.



Fittings

Fittings are the pieces of a drip system that are used to connect, extend, angle, plug, or attach a part to the drip tubing. When utilizing barbed and compression fittings, use a water-soluble lubricant or some hot water to make the attachment process easier.



Air Vents

Air vents should be installed at the highest point on a drip line, especially when on a slope to avoid air from being sucked back into the emitters. Air in the line can draw in debris and plug up your system.



End Closures

End closures prevent water from running out of the end of the tube. If you don't have an end closure, you can also bend and crimp the tube. Secure the crimped end with a cable tie, electrical tape or a figure eight fitting. These methods allow for easy opening of the tubing during maintenance.

