



Elsinore Valley Municipal Water District

Temescal Gardens Drip Irrigation Designs for Homeowners



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Why use a Drip System?

What is Drip Irrigation?

Drip irrigation works by distributing water directly to the soil at a very low rate (in gallons per hour) from a system of small diameter plastic tubing fitted with outlets called emitters or drippers. Drip irrigation is highly efficient because the water soaks into the soil before it can evaporate or run-off. The water is also applied close to the plant root zone providing a high moisture level in the soil in which plants can thrive.

Why Use Drip Irrigation?

A properly designed and installed drip irrigation system can achieve up to 90% irrigation efficiency.

This can significantly reduce your water use. Drip irrigation also allows you to:

- Match the water application rate to each plant
- Apply water directly to the root zone of the plant
- Eliminate runoff, overspray and evaporation
- Reduce disease problems associated with moisture on some plants
- Improve plant health by irrigating efficiently
- Prevent damage to property such as asphalt windows, walls, and fences



Stained Wall
Stained Window



Asphalt Damage



Water Runoff



Benefits of Drip Irrigation

- Water the plants you want to grow not weeds
- Easy to install

Can be inexpensive

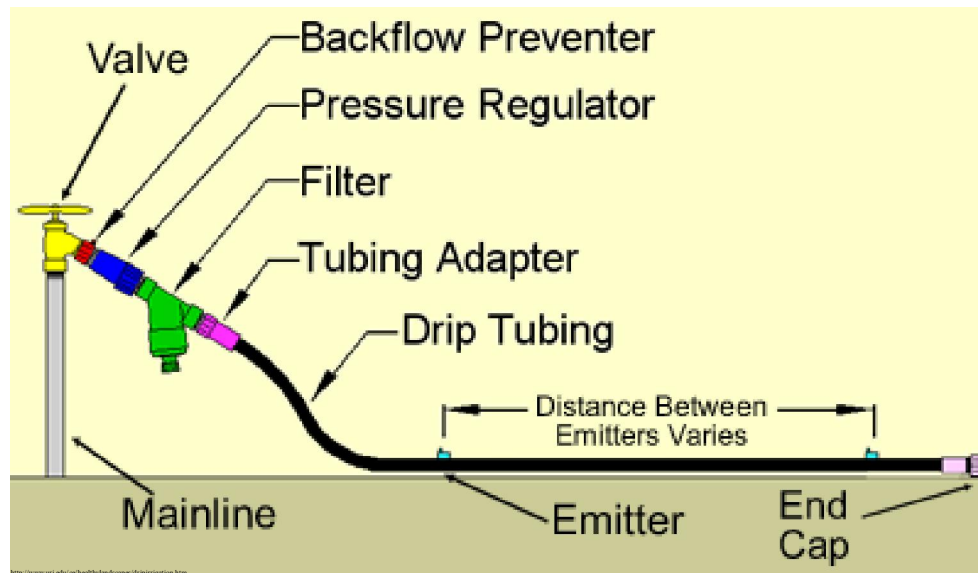
Reduces disease problems associated with moisture on some plants

Promotes healthier plants by increasing its size and overall quality

Basic Parts of a Drip System

Drip Irrigation Components

The main components of a drip system consist of a mainline, valve, backflow preventer, pressure regulator, filter, tubing adapters and fittings, drip tubing, emitters and an end cap. They are divided into four categories: control zone components, distribution components, emission devices and tools.



Control Zone Components

Controls the quality of water (filter), whether the system is off/on (valve), and the pressure of the system (pressure regulator).

Valves:

Turns the water flow on or off through the pipe. There are two types of valves: an isolation valve which is operated manually or a control valve which is automatic and is usually electric-powered using a solenoid.

Backflow Preventer:

A backflow preventer is a device that prevents any unwanted contaminants from being sucked back into the main drinking water line. All irrigation systems must have a backflow preventer at all times. Check with your city on which type to use.

Pressure Regulator:

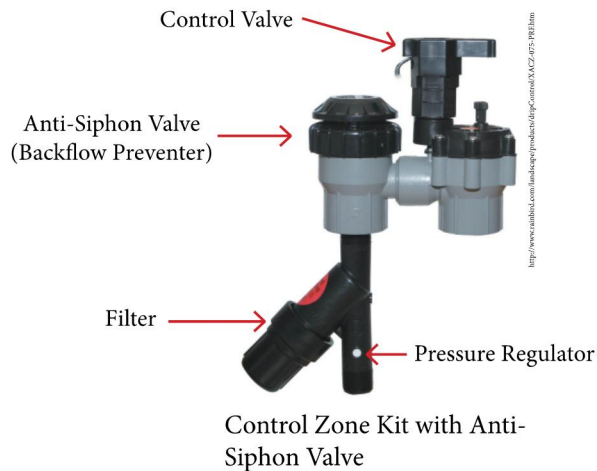
A pressure regulator keeps the water pressure coming to your home at a constant level. Since water pressure can vary throughout a water district, building codes require houses to have a pressure

regulator on the water line going into a house (usually set between 50-60 psi). Most irrigation systems do not have pressure regulators installed. Drip irrigation systems are designed for very low pressures (20-30 psi) and require a pressure regulator. They are usually installed after the filter.

Basic Parts of a Drip System

Filter:

A filter in a drip system is a must because it keeps dissolved substances such as small grains of sand from clogging the emitters over time. There are two types of filters: disc filters and screen filters. It is recommended to use a filter with a 150 to 200 mesh. It is best if the filter is installed between the control valve and the pressure regulator.



Distribution Components

Delivers the water reliably, safely and efficiently to each outlet.

Tube Fittings:

Fittings are plastic connectors such as couplings, tees, ells and adapters that attach the drip tubing to other tubes and to the rest of the drip system. There are two types of fittings: *barbed fittings* in which the tube goes over the fitting and *compression fittings* where the tube slides inside the fitting and holds it in place. Barbed fittings are best used when you are going to bury your tubing and compression fittings are best used when they are not buried.



Compression Fittings



Barbed Fittings

Basic Parts of a Drip System

Drip Tubing:

Drip tubing is a special thin-walled tubing made out of polyethylene which has a low pressure rating. The common sizes for a drip system are 3/4", 1/4", or 1/2".



Inline Emitter Tubing



Blank Tubing

Emission Devices

Emission devices control the application of water to the plants.

Emitters:

Emitters are small plastic devices that control how fast the water drips out onto the soil. They can either screw or snap onto a drip tube or pipe. .



Emitter



Multi-Outlet Emitter



Micro Bubbler



Micro Spray

Basic Parts of a Drip System

Flush Valve or End Cap:

It is important to cap the end of the drip tubing because without it the water will run out at the end of the drip tube. It is important to keep in mind that tubes sometime develop sediments or algae over time so it is recommended to flush out the drip tubing once a year.



Flush Cap

Tools

These tools are needed in order to install the drip irrigation system fast and efficiently.



<http://www.rainbird.com/images/products/irrigation/xeriman.jpg>

Xeriman Tool



<http://www.rainbird.com/images/products/irrigation/tie-down-stake.jpg>

Tie Down Stakes



<http://www.rainbird.com/images/products/irrigation/drip-tubing-cutter.jpg>

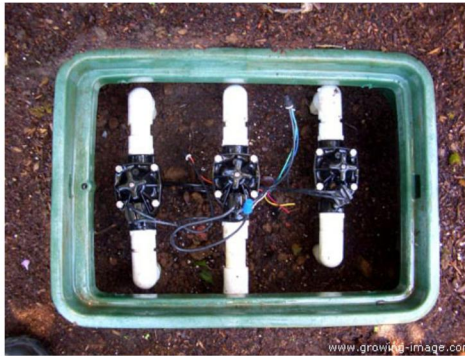
Drip Tubing Cutter

How to Install a Drip Irrigation System

How to Start

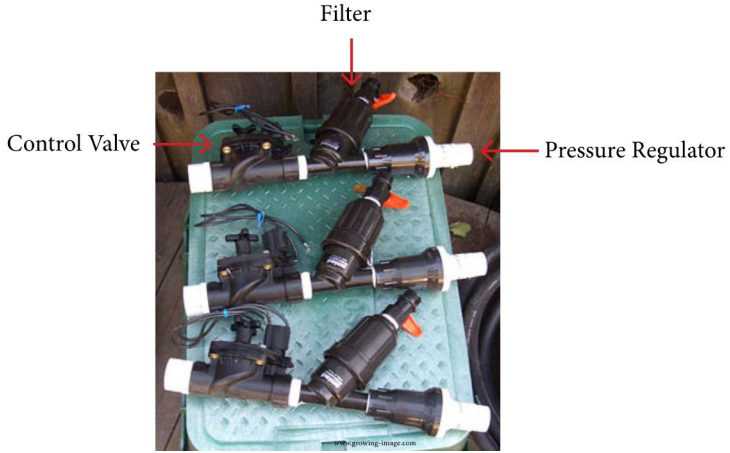
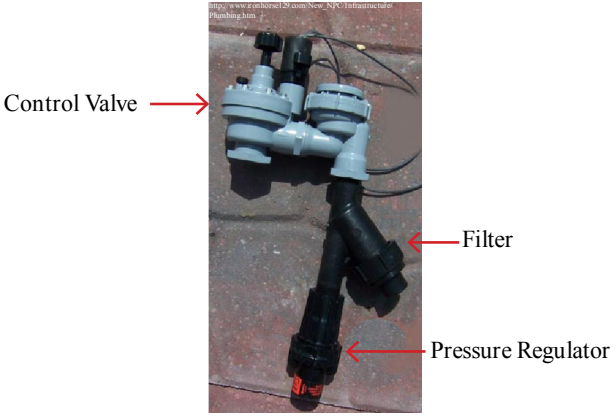
1) Determine the water source for the drip system. If you are converting an existing sprinkler system to a drip system using a retro-fit kit follow the guidelines on page 11. If you are converting an existing valve follow these instructions.

A) Locate the valves which are usually around the outside wall of the house or in a green irrigation control box.



Irrigation Control Box

B) Add the filter and the pressure regulator after the control valve and connect it to the main supply line.



How to Install a Drip Irrigation System

2) Determine the drip method you wish to water the plants. There are two basic ways:

A) Point Source:

- Watering of specific plants through emitters or bubblers.

B) Total Coverage (Broadcast):

- Where 100% coverage is required by using in-line drip tubing or micro-sprays.

3) Lay out the supply line of 1/2" tubing between the base of the plants. Make sure to have enough tie down stakes to help keep the tubing in place or else it will tend to curl and make installation difficult. Use fittings to connect the tubing wherever the tubing has to turn at a sharp angle or branch out to another section.



Blank Tubing Layout
Connect Tube

In-Line Drip Tubing Layout

Compression Fitting to

Things to Keep In Mind

Length/Flow: Limit the supply line to about 200 feet per zone because the longer the line is the more pressure it will lose. Also the more emitters installed the more pressure you will lose.

Elevation: Take into account that elevation affects water at about 0.433 psi per foot change.

For example if you are running a supply line that rises 10 feet in elevation from the valve to the end of the line you will lose about 5 psi (10 feet x 0.433 psi) going up a 10 foot slope.

Emitters: You cannot use the same size or number of emitters for all plants. Smaller plants will need lower flow or fewer emitters. Larger plants will need higher flow or more emitters.

Maintenance: Once a month, check the system for leaks and plugged emitters. Also remember to remove and clean the filter.

How to Install a Drip Irrigation System

4) Install the emitters at the base of the plants at about 9" - 12" apart inches on center. Keep in mind that if you are installing the system for existing plants that have already been established then you would place the emitters throughout the root zone of the plants. There are two ways to install emitters.

A) You can use a punch to open a hole in the main supply line and then insert the emitter

or

B) You can insert the emitter directly if it comes with an insert barb that is sharp enough to be punched through the line without using a punch.



5) Flush the system before you run it by leaving the end of the tubing open and letting the water out. This will remove any soil or debris that may have gotten into the system during installation.

6) Close the end of the supply line by bending over the end of the tube and using a figure-eight end cap.



7) You can bury the tubing by adding a layer of mulch on top to hide the tubing and keep water from evaporating.

How to Convert a Sprinkler System to Drip Irrigation

Rain Bird 1800 Retro-Fit Kit



1800 Series Spray Body



1800 Series Xeri-Cap



1 Locate the spray head you wish to



2 Remove the top of the spray head by twisting it and removing the whole assembly



3 Insert the new 1800-Retro drip emitter into the hole and drop the body. Tighten the top.

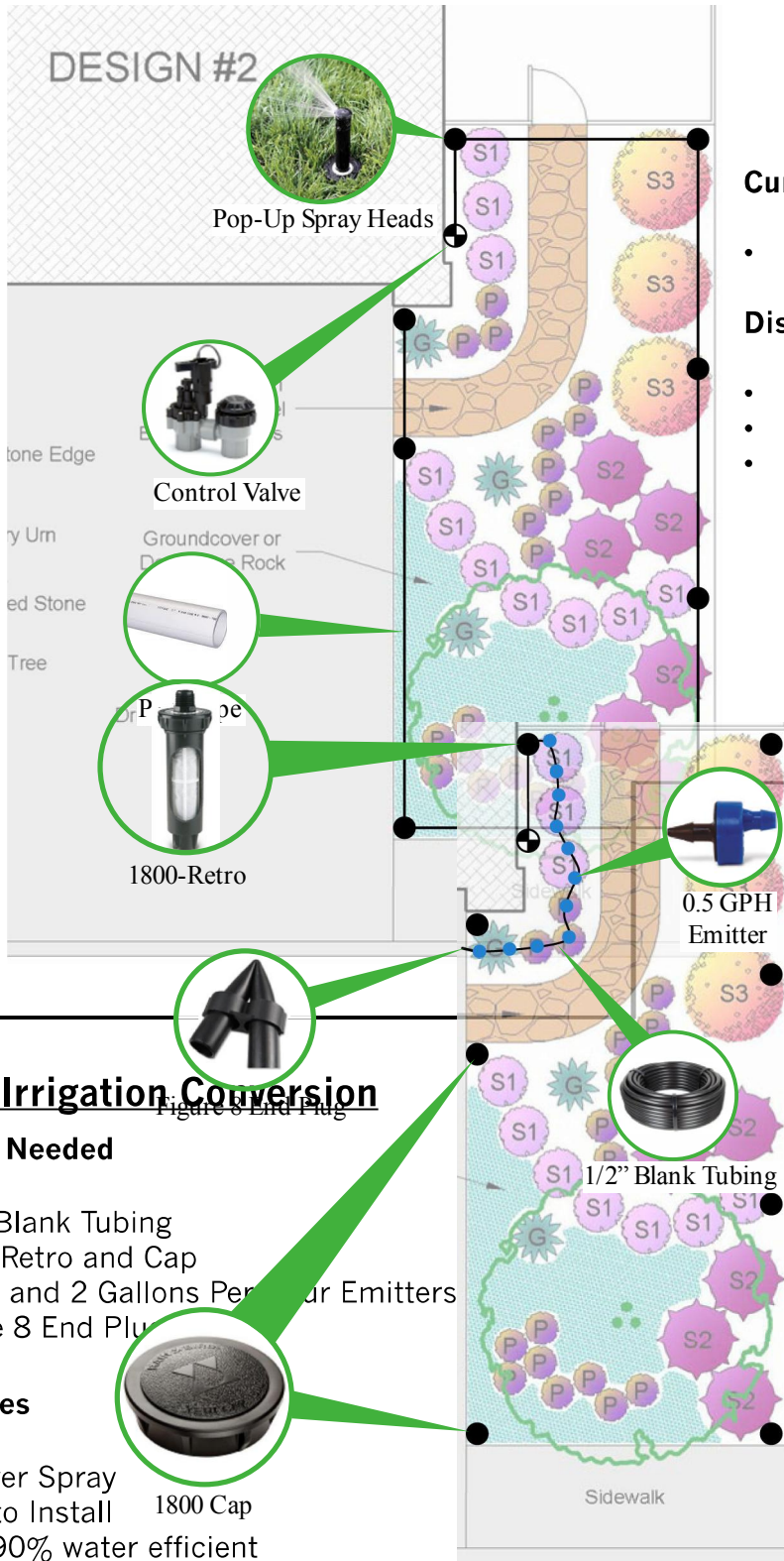


4 Use Easy Fit Compression Fittings to attach the drip tubing.



5 Use the Xeri-Cap to cap off the remaining sprinkler heads.

Drip Installation Examples



Existing Sprinkler System

Current Products Installed

- Pop-Up Spray Heads

Disadvantages

- Over Spray
- Water Runoff
- High Precipitation Rate (Gallons Per MINUTE)

Drip Irrigation Conversion

Figure 8 End Plug

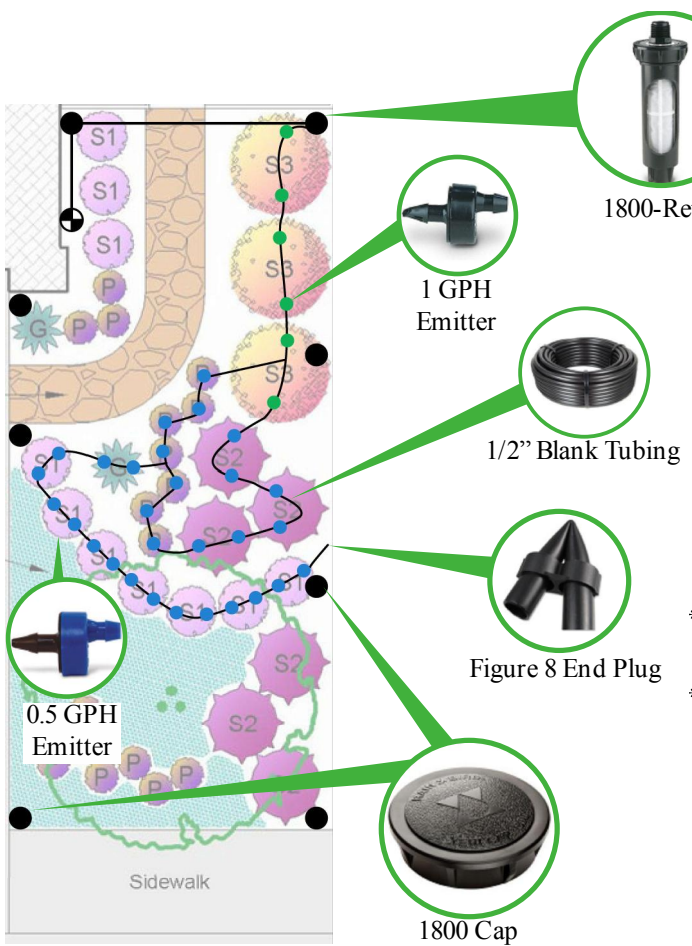
Products Needed

- 1/2" Blank Tubing
- 1800 Retro and Cap
- 0.5, 1 and 2 Gallons Per Hour Emitters
- Figure 8 End Plug

Advantages

- No Over Spray
- Easy to Install
- Over 90% water efficient
- Low Precipitation Rate (Gallons Per HOUR)

Drip Installation Examples



Drip Installation #2

Plant Type	Recommended Number of Emitters Per Plant
Trees - Small to Large	Four to eight (2 GPH) emitters spaced 18"- 24" apart around the tree
(S1) Shrubs - 3 feet high or less	Two (0.5 GPH) emitters spaced 9"- 12" apart on center
(S2) Shrubs - 3 to 5 feet high	Two (0.5 GPH) emitters spaced 12"- 18" apart on center
(S3) Shrubs - 5 feet high or more	Two (1 GPH) emitters spaced 12"- 18" apart on center
(P) Perennials	One (0.5 GPH) emitters at the base of the plant
(G) Grasses	Two (0.5 GPH) emitters spaced 9" - 12" apart on center
Lawn Substitute	Two (0.5 GPH) emitters spaced 9" - 12" apart on center

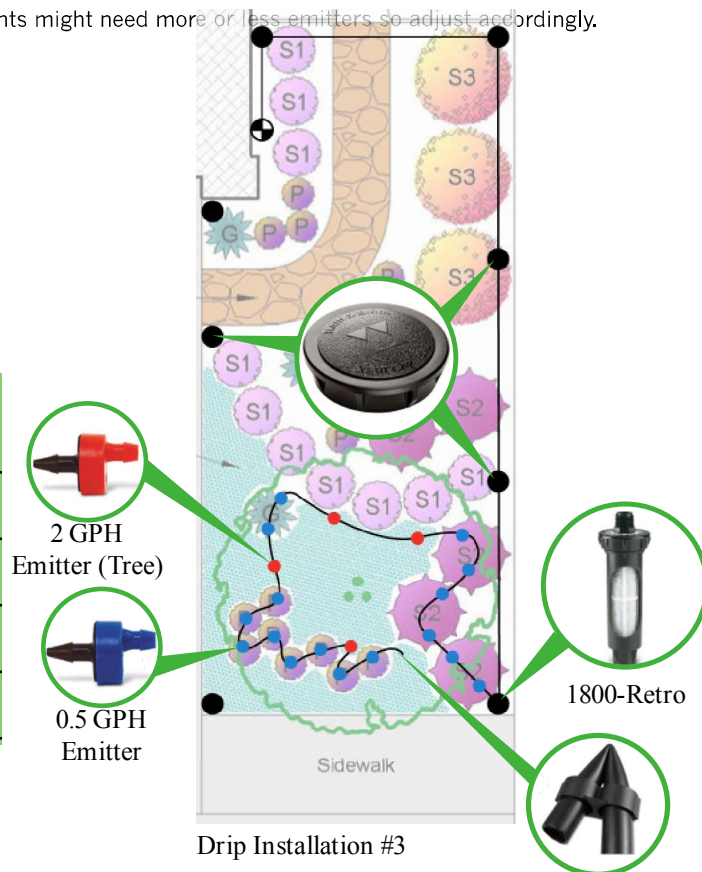
* Recommended emitters are for the plants listed in the *Temescal Gardens Landscape Designs for Homeowners* book.

*Some plants might need more or less emitters so adjust accordingly.

Recommended Watering Schedule for Drip Irrigation			
Season (Month)	Days/Week	Days	How long to water?
Summer Mid Jun. - Mid Sept.	3 days	Mon, Wed, Fri	Run for 30 min at 5 am and another 30 min at 7 am.
Fall Mid Sept. - Mid Dec.	2 days	Mon, Thurs	Run for 30 min at 5 am and another 30 min at 7 am.
Winter Mid Dec. - Mid Mar.	1 day	Wed	Run for 20 min at 5 am and another 20 min at 7 am.
* Use this watering guide as a reference. Spring Mid Mar. - Mid Jun.	2 days	Mon, Thurs	Run for 30 min at 5 am and another 30 min at 7 am.

*Your landscape may need more or less water depending on the planted material.

*Watch out for signs of plant stress to know whether or not to increase or decrease the watering time accordingly.



Drip Installation #3