

# Drip Irrigation



## Regular Maintenance

- Check and clean the filter as needed. Reduced pressure may be a sign that the filter is clogged. Disc filters tend to clog less quickly and should be rinsed with clean water. For screen filters, scrub them with a toothbrush while immersed in a bowl of water and rinse well.
- Take the end caps off of each line and flush the line by running water through it at the beginning of each summer and at least one more time during the season. This is not necessary with self-scrubbing in-line emitter tubing.

## Protecting Your System from Frost Damage

- To prevent winter frost damage, install manual drain valves in low spots, such as where a line passes beneath a walk. Do not use automatic drain valves because they waste water and are unreliable.
- Before heavy frost occurs, drain or blow out water from all fittings, valves and sections of lines that do not have emitters at low points. Shut off the main water supply, then manually open any automatic valves and open the “bleed” valve. Loosen or remove end caps at the bottom of lines to thoroughly drain the system. If fittings are situated so that water stays in them, lift sections of tubing so that they drain through an open end cap or emitters, or disconnect fittings to allow the water to drain.
- Take head assembly indoors when temperatures approach freezing.

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## Tools Needed for Installation:

- Hand pruners or tubing cutter
- Teflon Tape
- Pliers
- Screwdriver
- Towel

## You may also need:

- Irrigation tubing punch
- Saw (to cut PVC pipe)
- Shovel and mattocks
- One-step PVC solvent if using PVC pipe



## this issue

Plan a Drip System [P.1](#)

Types of Systems [P.2](#)

Run Times [P.3](#)

Prevention & Maintenance [P.4](#)

## Steps for Planning a Simple Drip Irrigation System

### 1) Draw a map of your garden

Indicate length and width of garden beds and areas connecting them. Show the water meter, hose bib(s), and the type, size and location of plants

### 2) Measure the flow rate and pressure of your water source

Make sure no water is being used inside your home when you perform the following tests to measure your flow and pressure outside.

To determine the **flow** in gallons per minute (gpm) and per hour (gph):

Use a bucket of known capacity. Open the garden spigot to full flow. Time how many seconds it takes to fill the bucket. Then do the math

$(60 \text{ sec per minute} / \text{measured seconds}) \times \text{gallons of bucket} = \text{gpm}$

The gph determines the maximum area that can be operated at one time, creating a watering zone.

To determine water pressure (the force pushing the flow of water) in pounds per square inch (psi), use a water pressure gauge (available at garden centers) attached to the garden spigot. Record the available pressure. Most homes have water pressure that is greater than drip irrigation systems and require a pressure regulator to reduce the pressure so that drip parts are not damaged.

### 3) Choose emitters or micro-sprays appropriate for each playing area

Determine which type of drip system will work best for your garden based on your budget and product specifications for gph, psi, and maximum tubing length per zone. Add up the total gph output per zone to be sure your total flow can accommodate the number of emitters needed to water an area. If not, split the area into multiple zones. In residential gardens, it is best to use 0.6 gph emitters. While you can choose emitters that put out water faster, this slower rate will help get the water to the plants' roots.

### 4) Determine how many zones you will have in your systems\

Group plants by their water needs. Don't water plants requiring lots of water with plants that are drought tolerant. For healthy plants and efficient water use, each grouping should be set up to be watered as an individual zone with its own schedule.

### 5) Sketch a layout showing where your drip tubing will be placed in each bed

Be sure to factor in how your irrigation will hook up to your water source. Identify the easiest places to tunnel under walks or consider connecting to more than one faucet is needed to get water to an area across a driveway. Tunneling short distances can usually be done inexpensively with a rented water jet.

### 6) Determine how you want to control your system – manual vs. automatic

The choice depends on your budget and how much automation you want in the system. Manual is the simplest system, but cannot be connected to hose bibs for more than 12 hours. A quick connect device is needed. Automatic allows more freedom, but is required to be connected to a dedicated, permanent line with an approved backflow device. A plumber or irrigation contractor is needed.

### 7) Backflow Prevention

Whether you manually or automatically control your irrigation system, a backflow prevention assembly is required by law to prevent dirty water from contaminating your home drinking water and the local drinking water supply.

### 7) Make a list of the number of parts and tubing needed to construct the system

Allow for a few extra connectors, couplers, plugs, emitters and end fittings for quick repair and maintenance. Include PVC piping in diameter wider than the drip tubing to make a protective sleeve if you need to pass under walkways.

# Which Type of System to Install



| Equipment   | Pros  | Cons  | Best Uses  |
|---|---|---|--|
| <b>Pressure-Compensating Emitters (individual or in-line)</b> | <ul style="list-style-type: none"> <li>Apply water uniformly on slopes and large gardens</li> <li>Resist clogging</li> </ul>  | <ul style="list-style-type: none"> <li>Cost slightly more than other types</li> </ul>   | <ul style="list-style-type: none"> <li>Sloped or large gardens</li> <li>Shrubs, trees and perennials</li> </ul>  |
| <b>Soaker Hoses</b>   | <ul style="list-style-type: none"> <li>Inexpensive</li> <li>Readily available</li> <li>Easy to lay out</li> </ul>   | <ul style="list-style-type: none"> <li>Watering rate varies through garden, especially on sloped sites</li> <li>Wastes water in unplanted areas</li> <li>May contain toxic residue</li> </ul> | <ul style="list-style-type: none"> <li>Dense annual and perennial beds</li> <li>Small gardens</li> <li>Used only on planted areas, with solid tubing connection to faucet</li> </ul>   |
| <b>Individual Drip Emitters</b>                               | <ul style="list-style-type: none"> <li>Apply water only where needed</li> </ul>   | <ul style="list-style-type: none"> <li>Installing large numbers of emitters is time consuming</li> <li>As plants grow, need to add more emitters</li> </ul>                                   | <ul style="list-style-type: none"> <li>Young shrubs and trees that only need water for the first few years</li> <li>Containers</li> </ul>  |
| <b>In-Line Emitters</b>                                       | <ul style="list-style-type: none"> <li>Easy to install in large areas</li> <li>Damage-resistant</li> <li>Pressure-compensating types apply water uniformly</li> <li>Most efficient if installed properly</li> </ul> | <ul style="list-style-type: none"> <li>May not be efficient for sparse plantings if installed improperly</li> </ul>   | <ul style="list-style-type: none"> <li>Dense perennial tree and shrub plantings</li> <li>Sparse plantings if installed properly</li> </ul>   |
| <b>Drip Tape</b>  | <ul style="list-style-type: none"> <li>Inexpensive</li> <li>Easy to install in large areas</li> <li>Uniform watering</li> </ul>   | <ul style="list-style-type: none"> <li>Only runs in straight lines</li> <li>Shorter-lived than other types</li> </ul>   | <ul style="list-style-type: none"> <li>Annual, perennial and vegetable gardens</li> <li>Temporary systems to establish drought-tolerant plants</li> </ul>                              |
| <b>Microsprays</b>  | <ul style="list-style-type: none"> <li>Apply water only when needed</li> </ul>  | <ul style="list-style-type: none"> <li>Watering rate varies within spray pattern</li> <li>Spray may blow away</li> <li>Vulnerable to damage</li> <li>Sprays foliage</li> </ul>                | <ul style="list-style-type: none"> <li>Groundcovers, seedlings and dense vegetable beds</li> <li>Large trees that need water, such as some fruits</li> <li>Small Turf areas</li> </ul> |

## Run Times for 0.6 gallon per hour Emitters



| Planting Type               | Emitters and Rows of Drip Line Spacing  | Weekly Water Need   | Total Weekly Run Time  |
|-----------------------------|---|---------------------|--|
| Vegetable garden or annuals | Emitters: 12-18" apart<br>Rows: 12-18" apart  | ¾ - 1 inch per week | 60-140 minutes for 1 inch of water per week                                    |
| Perennials                  | Emitters: 18-24" apart<br>Rows: 18-24" apart  | ½ inch per week     | 70-120 minutes for ½ inch of water per week                                    |
| Shrubs                      | Emitters: 18-24" apart<br>Rows: 18-24" apart  | ¼ inch per week     | 30-60 minutes for ¼ inch of water per week                                     |
| Trees                       | Emitters: 18-24" apart<br>Rows: 1 foot from both sides of trunk a second line at tree's drip line | ½ - 1 inch per week | 70-120 minutes for 1.2 inch of water per week; 2.5-4 hours for 1 inch per week |

### Avoiding Damage When Gardening

- Use high quality parts that resist damage. Avoid use of small "spaghetti tubing to individual plants, which is easily cut or moved by weeding and digging.
- Lay drip lines on the surface or under thick mulch so they can be easily located and moved before digging or planting. Do not bury them deep in the soil.
- Lay out drip and soaker tubing in straight-line grids or gently curving parallel runs that come near to each plant and are easy to locate before digging in the garden or to inspect for damage.
- Make a map of complex systems to simplify inspection and maintenance when needed.



### How Long to Run Your System?

*A good rule of thumb is to wet at least 50 percent of the root area of each plant.*

*The number of emitters and spacing depends on the soil type and plants. Use more emitters on sandy soil, less on clay or loam.*