

Drip Irrigation

Vegetables, Ornamentals, Lawns

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<http://www.ext.colostate.edu/>

The Colorado Master Gardener Program

Contact a CMG Volunteer about your yard and garden question

Search on-line yard and garden publications



<http://www.cmg.colostate.edu/index.shtml>

<http://www.ext.colostate.edu/ptlk/index.html>



Colorado Gardening for Everyone

Advice and Observations from your CSU Extension Horticulture Agents and Specialists

CO-Horts

<http://csuhort.blogspot.com>

Landscape Irrigation Efficiency

Applying the correct amount of water...



Landscape Irrigation Efficiency

Applying the correct amount of water...

to the right place...



Landscape Irrigation Efficiency

Applying the correct amount of water...
to the right place...

at the right time and frequency...and...



Landscape Irrigation Efficiency

Applying the correct amount of water...
to the right place...

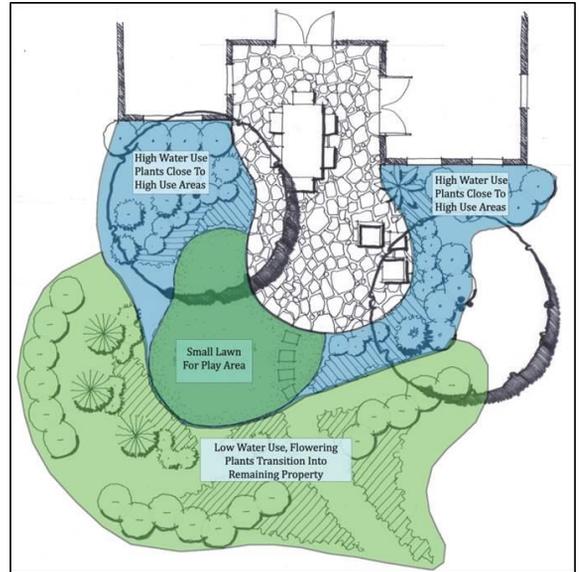
at the right time and frequency...and...

with the least amount of labor and cost.



Group Plants According to Water Needs

- Create hydrozones
- Avoid mixing high- and low-water species
- Turf and ornamental beds should not be on the same station/schedule





Pediocactus simpsonii

Irrigation Management Variables

Plant rooting depth

- Deeper roots = more days between irrigation events

Plant ET/water use rate

- Lower ET = more days between irrigation events

Soil characteristics

- Higher water-holding capacity = more days between irrigation events

Plant's capacity to tolerate stress

In horticulture, YOUR ability to tolerate plant stress



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In horticulture, YOUR ability to tolerate plant stress



Plants may not die from drought stress, but...



Drip Irrigation (aka Microirrigation)



- Targeted water application
- Greater than 90% efficient
- Lower total water use
- Low pressure



Drip Irrigation (aka Microirrigation)

- Targeted water application
- Greater than 90% efficient
- Lower total water use
- Low pressure
- Decreased weed and disease pressure



Drip Irrigation (aka Microirrigation)

- Relatively inexpensive to install
- Relatively easy DIY installation
- Easy to operate
- Easy to automate using timers and other gadgetry



Rain Bird
Rain Bird GRDNERKIT Drip Irrigation Gardener's Drip Kit
 ⭐⭐⭐⭐☆ • 248 customer reviews | 92 answered questions

Price: \$37.10 & FREE Shipping Details

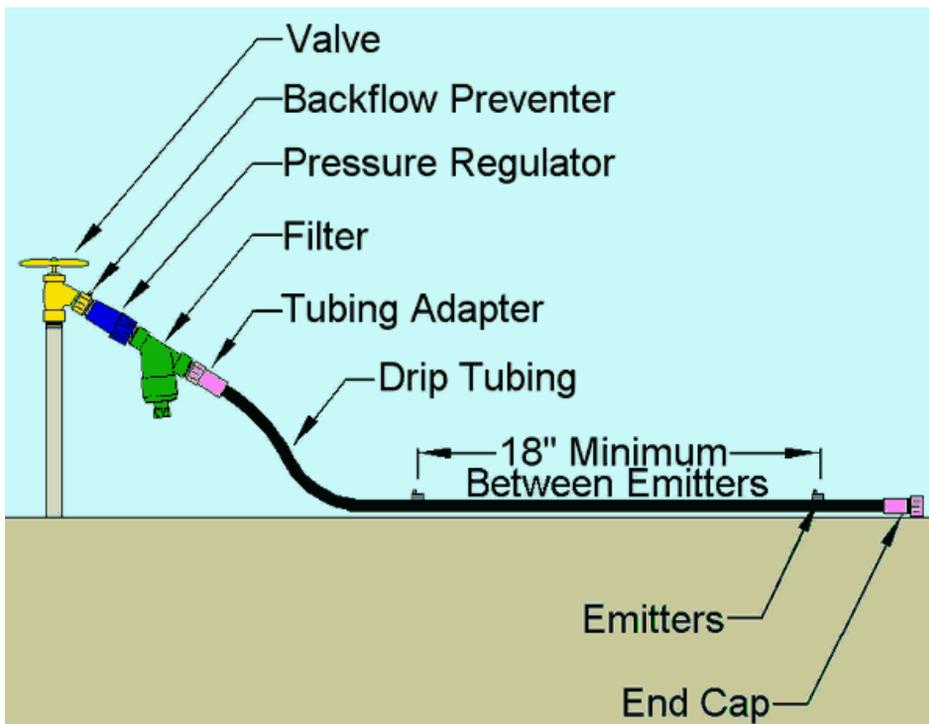
In Stock.
 Wait 'n' Thursday, May 17! Order within 13 hrs and choose **Two-Day Shipping** at checkout.

Ships from and sold by Amazon.com. Gift-wrap available.

- Provides everything needed to install a watering saving Drip system with coverage up to 75 square feet in garden or landscaped areas.
- Precise Drip watering for green, healthy plant growth with low water usage and fewer weeds.
- Simple installation without need for digging or plumbing skills.
- Waters most types of plants with emitter devices for better health and water savings up to 40%.
- Includes installation tool to simplify insertion and removal of small barbed fittings and drippers/emitters.
- 50-piece kit with instruction manual includes spot watering emitters, 1/4" distribution tubing, stakes, and fittings, 1/2" emitter and distribution tubing, stakes and fittings, slit regulator and facet connection kit.

Compare with similar items:
 New (10) from \$37.10 & FREE shipping. Details

Prime Student College student? Get FREE shipping and exclusive deals. [Learn more](#)



Filtration and Pressure Control are Essential!!!



Clean Filters Frequently



Drip System Filtration

Screen filter



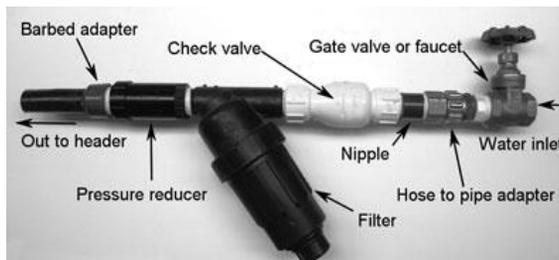
Disk filter



Both 120 mesh; work equally well

Pressure Regulator

- Reduces drip system operating pressure down to 10-30 psi
- Maintains more constant flow and pressure
- Prevents damage to emitters and blowouts
- Should not be constantly under pressure; install AFTER timers or main valve
- Install AFTER filter (or dirty water may plug it)



What about Drip Irrigation Kits?



What You Will Need: Water Supply

- Domestic water
 - Clean (no dirt, grit, salt)
 - Reliable
 - Adequate pressure



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- Domestic water
 - Clean (no dirt, grit, salt)
 - Reliable
 - Adequate pressure
- Well water
 - CAN have “particulates”
 - CAN be salty
 - CAN be reliable



What You Will Need: Water Supply

- Domestic water
 - Clean (no dirt, grit, salt)
 - Reliable
 - Adequate pressure
- Well water
 - CAN have “particulates”
 - CAN be salty
 - CAN be reliable
- Rain barrel
 - Can it work?



What is wrong with this picture?

Rain Barrels for Drip Irrigation Water Source

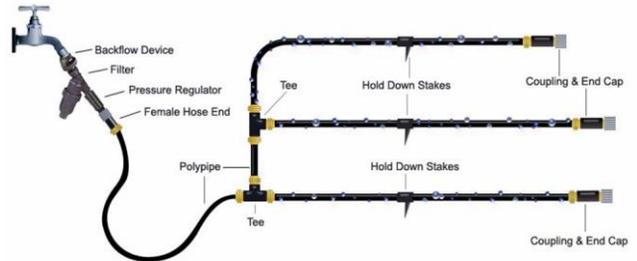
- Very low water pressure
- Most water will be released through the emitters closest to the barrel, and emitters at the end of the run may not discharge any water at all
- Should be elevated minimum of 3 feet
- Gain 0.433 PSI for every foot of elevation



What About Soaker Hose/"Leaky Pipe"?



What About Soaker Hose/"Leaky Pipe"?



Using Soaker Hose for Drip Irrigation

- Must filter – or it will clog over time
- Hard water hastens clogging
- Water distribution usually not uniform along length
- Optimal operating pressure 10 PSI
- Can grow algae and other “slime”



What You Will Need: Water Supply Main Line

- Usually PVC tubing



Polyethylene Tubing

Size: 1/2"

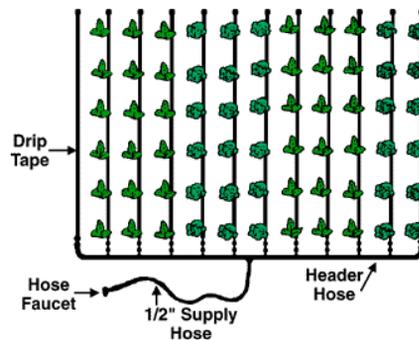
Length: 1000'

Quantity	Price/Each
1+	\$95.99
10+	\$92.49
50+	\$85.99

1

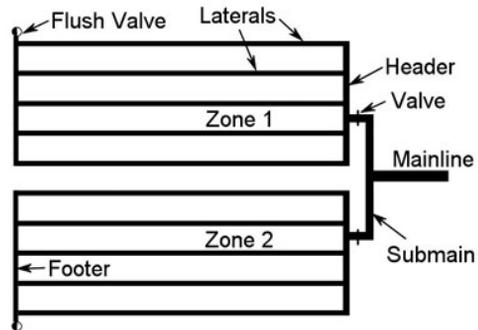
Header

- Allows more even water distribution
- Allows zoning for differing irrigation needs
- Allows for smaller zoning when pressure is very low



Drip Irrigation Footer

- Helps make water flow more even
- Allows installation of one drain or flush valve per zone

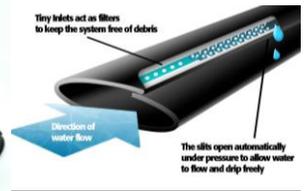


Doesn't have to be fancy – or pretty!



What You Will Need: Water Emitters

- Drip tape
- Drip emitters
- Inline emitter tubing
- Something to apply the water slowly, at low pressure

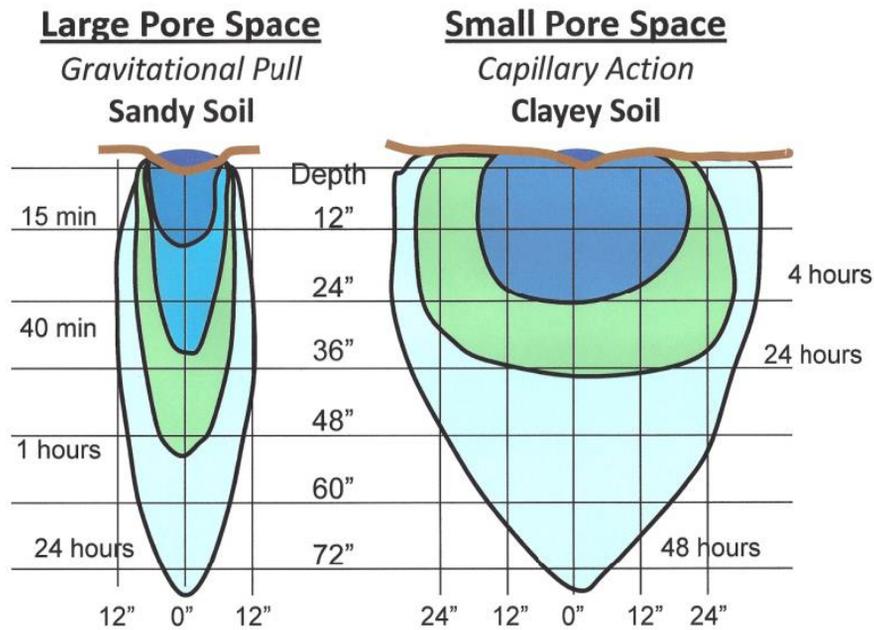
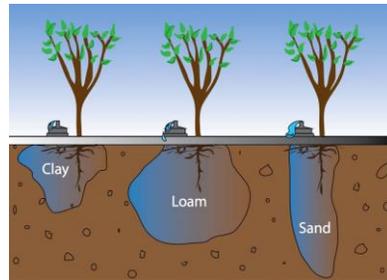


Successful Drip Irrigation is Dependent Upon Capillarity



Soil Considerations with Drip Irrigation

- Greater capillarity (spreading) with clay soils
- Deeper movement and less capillarity with sandy soils



Drip Tape



Line Source Emitters



- Easy to install
- Good for rows
- Regular spacing of holes/emitters
- Long-lasting
- Even flow if length restrictions are followed
- Fewer weeds and less disease

Inline Emitters



- Turbulent flow helps prevent plugging
- Dependent upon capillarity to work
- Spacing may not match that of plants



Landscape Products
EZ-ID-CV 17MM Dripline - .4GPH Emitters
500' Roll x 12" Spacing
 CV 12IN X.4GPH X500FT LPDRIPLN
 SKU#: 12075430

- Accepts standard 17MM brown fittings.
- Pre-installed built in emitters for simple installation.
- 12 inch emitter spacing.
- Flow rate of 0.4 GPH per emitter.
- Each emitter features a check valve for water flow control.
- Roll length is 500 feet.

Ewing List Price (per / 100 ft) \$56.50
[Log In To See Your Price](#)
 Minimum Order 500 ft
 Order in multiples of: 500 ft

qty. [Add to cart](#)
[Add to List](#)



Landscape Products
EZ-ID-CV 17MM Dripline - .6GPH Emitters
500' Roll x 12" Spacing
 CV 12IN X.6GPH X500FT LPDRIPLN
 SKU#: 12075630 | MFG#: LPDRIPLINE CV 12INX.6GPH

- Accepts standard 17MM brown fittings.
- Pre-installed built in emitters for simple installation.
- 12 inch emitter spacing.
- Flow rate of 0.6 GPH per emitter.
- Roll length is 500 feet.

Ewing List Price (per / 100 ft) \$56.50
[Log In To See Your Price](#)
 Minimum Order 500 ft
 Order in multiples of: 500 ft

qty. [Add to cart](#)
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Landscape Products
EZ-ID-CV 17MM Dripline - 1.0GPH Emitters
500' Roll x 12" Spacing
 CV 12IN X 1GPH X500FT LPDRIPLN
 SKU#: 12075930 | MFG#: LPDRIPLINE CV 12INX.1GPH

- Accepts standard 17MM brown fittings.
- Pre-installed built in emitters for simple installation.
- 12 inch emitter spacing.
- Flow rate of 1.0 GPH per emitter.
- Each emitter features a check valve for water flow control.
- Roll length is 500 feet.

Ewing List Price (per / 100 ft) \$56.50
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qty. [Add to cart](#)
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Rain Bird XQF1012100 1 in. Dripline Header 12 in. Spacing 100 ft Coil

★★★★★ (0 reviews)
 \$259.99



Rain Bird XQF1018100 1 in. Dripline Header 18 in. Spacing 100 ft Coil

★★★★★ (0 reviews)
 \$245.99

Inline/Dripline Tubing Maximum Lengths

Tubing Size	Maximum Run Length	Available Spacing & Emitter Combinations	Common Applications
1/4" Dripline	30 feet	.5 GPH emitters every 6" .5 GPH emitters every 9" .5 GPH emitters every 12" Note: 6" spacing is recommended if soil is sandy or plants are tightly planted next to one another	<ul style="list-style-type: none"> • Tree Rings • Densely Planted Landscapes • Small Gardens • Window Boxes • Raised Beds



Irrigation Application Rates and Time		Drip Tubing/Tape Emitter Flow Rate (gallon per hour per foot)				
		0.2	0.5	0.6	0.9	1
		Application Rate (Inches/hour)				
Drip Tubing Row Spacing (inches)	12	0.32	0.80	0.96	1.44	1.60
	18	0.21	0.53	0.64	0.96	1.07
	24	0.16	0.40	0.48	0.72	0.80
	30	0.13	0.32	0.38	0.58	0.64
	36	0.11	0.27	0.32	0.48	0.53
	Minutes to Apply One Inch					
	12	187	75	62	42	37
	18	281	112	94	62	56
	24	374	150	125	83	75
	30	468	187	156	104	94
36	561	224	187	125	112	

Point Source Emitters



- Flexibility
- Reliable and resistant to plugging
- Good for individual plants or containers
- Come in variety of flow rates
- Can be expensive



Irrigation of Individual Plants



Drip Irrigation of Individual Containers



Pressure Compensating (PC) vs. Non-pressure Compensating (NPC) Drip Emitters

- Most emitters are pressure compensating to some degree
- Drip emitters work BEST at 20 PSI operating pressure
- PC emitters are more expensive than NPC types
- PC emitters don't work well with gravity flow (rain barrel) systems
- Use PC emitters when drip is installed on slope greater than 5 feet drop



Emitter Installation



Goof plugs are important!

DripWorks
Build the system

Search by keyword or SKU

Account Cart (0)

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Home > 1/4" Goof Plug for Repair (Two Way)

1/4" Goof Plugs for Repair (Two Way)

★★★★★ 2 Reviews

*Pack Count

<input type="radio"/> 35 Pack \$3.60	\$3.60
<input type="radio"/> 100 Pack \$9.99	\$9.99

\$0.60 *Required Fields

1

Add to Wishlist Share

Description **Reviews**

These plugs are used to repair small or large holes in mainline tubing where an emitter or micro-sprayer was removed. Goof plugs can also be used to seal off the end of 1/4" Sooter Dripline.

One-Way Goof Plugs are also available.

If the hole in your tubing is too large to be repaired by a goof plug, a repair coupling must be used.



Mulch for Weed Prevention

- Inhibits weed seed germination – reduces seedling weed survival
- Reduces evaporation from soil surface, cutting water use by 25 to 50 percent
- Organic mulches improve soil tilth and help lessen soil compaction
- Stabilizes soil moisture
- Prevents soil compaction
- Moderates soil temperature extremes
- Controls erosion









Orbit

Orbit 58911 Complete Yard Watering Kit

★★★★☆ 79 customer reviews | 27 answered questions

Was: \$78.40

With Deal: **\$53.13** & **FREE Shipping**. [Details](#)

You Save: \$25.27 (32%)

In Stock.**Want it Wednesday, June 28?** Order within **15 hrs 54 mins** and choose **One-Day Shipping** at checkout. [Details](#)

Ships from and sold by Amazon.com. Gift-wrap available.

Item Package Quantity: 1

1	3
\$53.13	\$221.45

- Fully automatic yard watering kit turns your hose faucet into a 4-station sprinkler system
- No digging is required to easily install this watering system
- One dial controls all basic programming
- Rain delay for 24-, 48- and 72-hour settings

Drip Irrigation Resources

Utah State University

https://extension.usu.edu/irrigation/ou-files/ez-plug/uploads/Garden_Irrigation.pdf

Irrigation Tutorials

<https://www.irrigationtutorials.com>

Penn State Extension

<http://extension.psu.edu/plants/gardening/fact-sheets/irrigation-systems/building-and-operating-a-home-fruit-and-vegetable-garden-irrigation-system>

DripWorks

<https://www.dripworks.com/>

Rainbird

<http://www.rainbird.com/homeowner/education/DripIrrigationBasics.htm>