



Minnehaha Master Gardeners

Drip, Drip, Drip Irrigation
Gardening with the Masters 2024 Spring Event Table Talk
By Minnehaha Master Gardener Intern, Dan Heinemann

To Drip or not to Drip. How to decide if a drip irrigation system is best for your garden.

Drip irrigation is an efficient way to water small or large gardens. They are 90% efficient compared to a sprinkler system at 65-75%. Drip systems deliver the needed water to the root zone. It reduces runoff and evaporation. It supplies water slowly to the plant's root system.

Benefits noted by the University of Rhode Island are as follows:

1. Prevents disease by minimizing water contact with the plant leaves and stems.
2. Allows rows between plants to remain dry improving access and reducing weeds.
3. Saves time, money, and water because the system is so efficient.
4. Works effectively on uneven ground,

Issues and challenges

1. Cost
2. Water Pressure
3. Size
4. Maintenance

Designs

1. Simplest is a soaker hose run along the plants.
2. Supply lines with distribution lines with various emitters. See Figure 1.



How to get started.

1. Know your water pressure. 12-15 psi is the minimum pressure needed to support a system.
2. Lay out supply lines.
3. Lay out drip lines.
 - a. With typical household water pressures, 200 feet of line per zone is optimal.
 - b. Space emitters depending on the type used and plant needs.
 - c. Add valves to control lines being used.
 - d. Choose the type of emitters best for needs. See Figure 2.
 - e. Compression fittings. See Figure 3.
 - f. Decide what options you may add to your system.
 - g. Monitor and record how much time it takes to get the row properly watered.

Operations

1. Will need to monitor drip lines during the growing season to make sure spacing is correct and the correct emitters are being used.
2. Try to have plants with similar growing seasons and water needs in the same row or bed.
3. Use mulch over drip lines to protect from sun exposure and help retain moisture.
4. May use a liquid fertilizer injector, if so desired.
5. At the end of season check all emitters and fittings looking for function. Replacing damaged pieces in fall saves time in the spring.



Practical Observations

1. Start small and add over time.
 - a. Helps with up-front costs and time in setup.
 - b. Healthy soil is easier to water and works well with drip irrigation.
 - c. Do not be afraid to mix types of irrigation runs.
 - d. Do your homework, lots of good information out there.



Practical lessons from 20 years of experience.

1. Know your soil and the beds you have.
2. Use lots of mulch. Can even use paper mulch with runs under the paper.
3. Experiment and document the time it takes for a given bed to be properly watered.
4. Repair and replace in the fall.

Resources and sources of information:

University of Rhode Island

<https://web.uri.edu/safewater/protecting-water-quality-at-home/sustainable-landscaping/drip-irrigation/>

Oklahoma Cooperative Extension Service

<https://extension.okstate.edu/fact-sheets/drip-irrigation-systems.html>

Drip Works

https://www.dripworks.com/blog/advantages-of-drip-irrigation?gad_source=1&gclid=EAlaIQobChMIOfI9YOchAMVCTOtBh27mw2qEAAYASAAEgK_CyD_BwE

SDSU Extension Service

<https://extension.sdstate.edu/options-watering-home-gardens-and-landscape-planting>



Figure 1

TYPICAL SYSTEM LAYOUT SOLUTION FOR TEN 50 FT. ROWS
(For the dedicated gardener who wants superior results using drip irrigation)

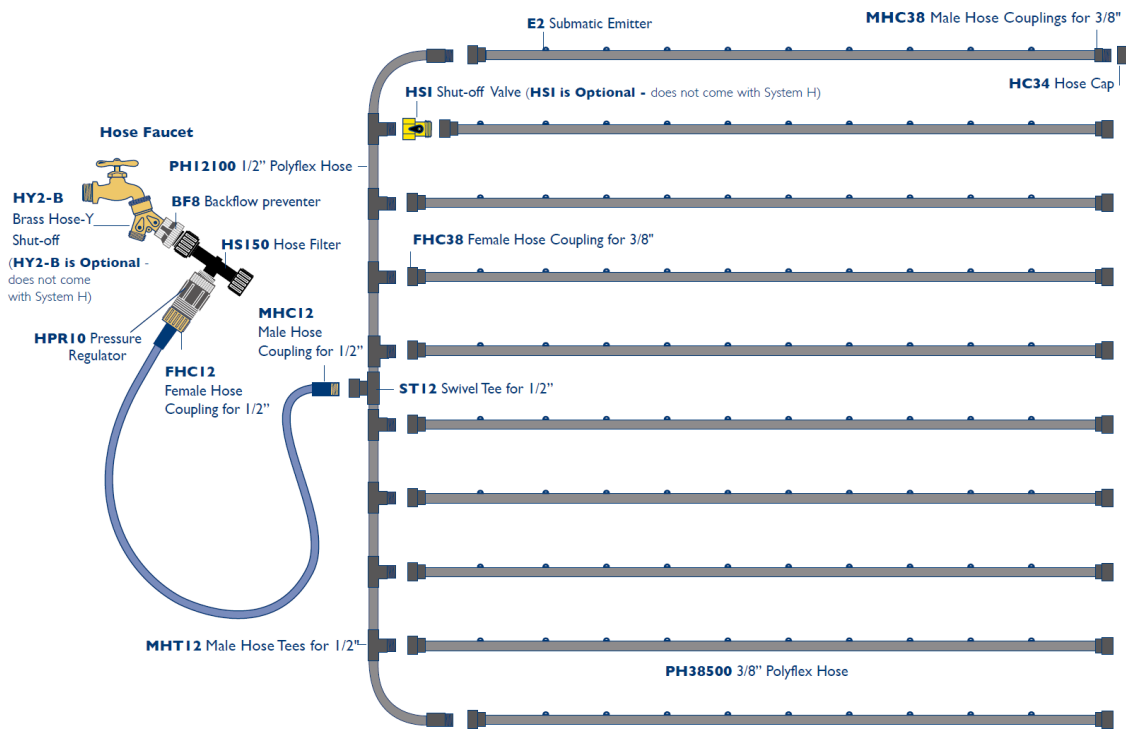




Figure 2

SUBMATIC EMITTER

• Use the *Submatic Emitter* on gardens, flower beds and landscapes • One of our most popular and economical emitters • Available in 2 GPH or 4 GPH flow rate at 10 PSI • Install with *Twist Punch TP-10* or *Submatic Insert Tool IT3* • Rec. Filtration: E2 - 140 mesh, E4 - 140 mesh

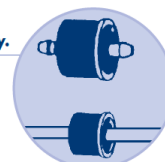
Order #	Flow	Unit Qty.
E2-50	2 GPH	50
E2-100	2 GPH	100
E2-1000	2 GPH	1000
E2-10000	2 GPH	10,000
E4-50	4 GPH	50
E4-100	4 GPH	100
E4-1000	4 GPH	1000
E4-10000	4 GPH	10,000



IN-LINE EMITTER

• For watering around trees and shrubs by placing a "loop" of emitters around the plant • Connect *In-Line Emitters* between lengths of 1/4" *Distribution Tubing 17250100* • Also good for running a strip of water through small planter boxes • Rec. Filtration: 120 mesh

Order #	Flow	Unit Qty.
ILE1/2-10	1/2 GPH	10
ILE1/2-100	1/2 GPH	100
ILE1/2-1000	1/2 GPH	1000
ILE-10	1 GPH	10
ILE-100	1 GPH	100
ILE-1000	1 GPH	1000



BUTTON EMITTER

• Suitable for spot watering of ornamentals and hanging baskets • Unique "turbulent flow pattern" minimizes clogging problems while providing precise emission rates • Attach to 1/4" *Distribution Tubing 17250100* to place emitter at plant's roots or insert directly onto *Polyflex Hose* • May be inserted onto *Polyflex Hose* with *Hand Punch HP3-B* but easier with *Easy Punch EP4-B* • Rec. Filtration: 120 mesh

Order #	Flow	Unit Qty.
BE1/2-10	1/2 GPH	10
BE1/2-100	1/2 GPH	100
BE1/2-1000	1/2 GPH	1000
BE1-10	1 GPH	10
BE1-100	1 GPH	100
BE1-1000	1 GPH	1000
BE2-10	2 GPH	10
BE2-100	2 GPH	100
BE2-1000	2 GPH	1000



PRESSURE-COMPENSATING EMITTER

• One of our favorite emitters because its excellent-design makes it less susceptible to clogging • Maintains 1 GPH flow rate regardless of fluctuation in pressure (7 to 45 PSI) from supply or elevation differences • Discharge can be extended away from lateral by use of 1/4" *Distribution Tubing 17250100* and *Connectors C14* • Well-adapted for sloping areas of landscapes and vineyards • Install with *Hand Punch HP3B* or with *Easy Punch EP4-B* • Rec. Filtration: 120 mesh

Order #	Flow	Unit Qty.
PCN-10	1 GPH	10
PCN-100	1 GPH	100
PCN-1000	1 GPH	1000
PCN2-10	2 GPH	10
PCN2-100	2 GPH	100
PCN2-1000	2 GPH	1000



TAKE-APART EMITTER

• Easy to grip and pull "key insert" can be removed for cleaning and resecured by snapping back into body • Used in landscapes and vineyards • May be inserted onto *Polyflex Hose* with *Hand Punch HP3-B* or with *Easy Punch EP4-B* • Rec. Filtration: 120 mesh

Order #	Flow	Qty.
TAE-10	1 GPH	10
TAE-100	1 GPH	100
TAE-1000	1 GPH	1000



PC JUNIOR EMITTER

• Innovative pressure compensating emitter provides uniform flow rate from 7 to 45 PSI, even in areas with varying elevations • Smaller version of Pressure Compensating Emitter PCN • Clog resistant design improves system reliability and performance • For sloping areas of landscapes and vineyards • Use with .125 x .187 *Distribution-Tubing 125187100* and *S-2 Micro-Stake* • Install with *Hand Punch HP3-B* or with *Easy Punch EP4-B* • Rec. Filtration: 120 mesh

Order #	Flow	Unit Qty.
PCJR1/2-10	1/2 GPH	10
PCJR1/2-100	1/2 GPH	100
PCJR1/2-1000	1/2 GPH	1000
PCJR-10	1 GPH	10
PCJR-100	1 GPH	100
PCJR-1000	1 GPH	1000
PCJR2-10	2 GPH	10
PCJR2-100	2 GPH	100
PCJR2-1000	2 GPH	1000



EMITTER FLOW CHART

EMITTER FLOW IN GALLONS PER HOUR (GPH)

PRESSURE	E2	E4	BE1/2	BE1	BE2	TAE	ILE1/2	ILE	MFE*	MFS*	TAE	TAS	PCN	PCN2	PCJR1/2	PCJR	PCJR2
2 PSI	1.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 PSI	1.5	3.0	-	-	-	.62	-	-	-	-	.62	.62	-	-	-	-	-
10 PSI	2.0	4.0	.45	.8	1.7	.88	.40	.9	7.0	7.0	.88	.88	1.0	2.0	.50	1.0	2.0
15 PSI	2.5	5.0	.60	1.0	2.0	1.10	.50	1.1	8.1	8.1	1.10	1.10	1.0	2.0	.50	1.0	2.0
20 PSI	3.0	6.0	.70	1.2	2.4	1.20	.65	1.3	10.3	10.3	1.20	1.20	1.0	2.0	.50	1.0	2.0
25 PSI	3.5	7.0	.75	1.3	2.6	1.40	.75	1.4	11.7	11.7	1.40	1.40	1.0	2.0	.50	1.0	2.0
30 PSI	4.0	8.0	.80	1.4	2.9	1.50	-	-	13.0	13.0	1.50	1.50	1.0	2.0	.50	1.0	2.0

* MFE and MFS (Multi-Flow Emitters) Fully open - Approximately 22 clicks



Figure 3

COMPRESSION FITTINGS

Compression Fittings - fit over Polyflex Hose with the following dimensions:

3/8"	.375" I.D.	x	.455" O.D.
1/2"	.600" I.D.	x	.700" O.D.
3/4"	.820" I.D.	x	.940" O.D.
1"	1.06" I.D.	x	1.20" O.D.

EASY FITTING INSTALLATION



FEMALE HOSE COUPLING

- With garden hose thread and gasket

Order #	Size	Unit Qty.	Bag Qty.
FHC38	3/8"	1	50
FHC12	1/2"	1	50
FHC34	3/4"	1	25
FHC1	1"	1	25
FHC16mm	16mm	1	50



3-WAY POLY TEE

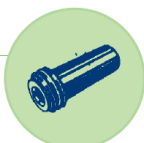
Order #	Size	Unit Qty.	Bag Qty.
T38	3/8"	1	50
T12	1/2"	1	50
T1238	1/2"x1/2"x3/8"	1	50
T34	3/4"	1	25
T3412	3/4"x3/4"x1/2"	1	25
T1	1"	1	25
T16mm	16mm	1	50
T1216mm	1/2"x1/2"x16mm	1	50



MALE HOSE COUPLING

- Used with Hose Cap HC34 to cap off ends of rows

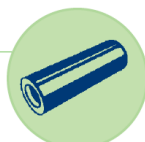
Order #	Size	Unit Qty.	Bag Qty.
MHC38	3/8"	1	50
MHC12	1/2"	1	50
MHC34	3/4"	1	25
MHC1	1"	1	25
MHC16mm	16mm	1	50



REPAIR COUPLING

- For connecting or repairing Polyflex Hose

Order #	Size	Unit Qty.	Bag Qty.
RC38	3/8"	1	50
RC12	1/2"	1	50
RC1238	1/2"x3/8"	1	50
RC34	3/4"	1	25
RC3412	3/4"x1/2"	1	25
RC1	1"	1	25
RC16mm	16mm	1	50
RC1216mm	1/2" x 16mm	1	50



SWIVEL HOSE TO POLY TEE

- With female hose threads and hose gasket in center

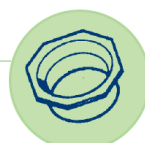
Order #	Size	Unit Qty.	Bag Qty.
ST38	3/8"	1	50
ST12	1/2"	1	50
ST34	3/4"	1	25
ST16mm	16mm	1	50



PVC TO POLY ADAPTER

- Use this adapter to connect Polyflex Hose to PVC

Order #	Size	Unit Qty.	Bag Qty.
Glues into 1/2" PVC socket			
PVCA38	3/8"	1	100
PVCA12	1/2"	1	100
PVCA16mm	16mm	1	100
Glues into 3/4" PVC socket			
PVCA34	3/4"	1	50
Glues into 1" PVC socket			
PVCA1	1"	1	50



MALE HOSE TO POLY TEE

- With male hose threads in center

Order #	Size	Unit Qty.	Bag Qty.
MHT12	1/2"	1	50
MHT34	3/4"	1	25
MHT1	1"	1	25
MHT16mm	16mm	1	50



FIGURE 8 END CLOSURE

- Polyflex Hose loops through closure at end of lateral line to close it off

Order #	Size	Unit Qty.	Bag Qty.
F838	3/8"	1	100
F812	1/2"	1	100
F834	3/4"	1	50
F81	1"	1	50



POLY ELBOW

- For sharp turns around a house, at the last rows in the garden, etc.

Order #	Size	Unit Qty.	Bag Qty.
EL38	3/8"	1	50
EL12	1/2"	1	50
EL34	3/4"	1	25
EL1	1"	1	25
EL16mm	16mm	1	50

