DripWorks

Quality Drip Irrigation

Drip Planning Guide

DripWorks

Quality Drip Irrigation

Drip irrigation is used on farms both large and small, in vineyards, home gardens, nurseries, urban balconies and rooftops all over the world. When DripWorks began selling drip irrigation products back in 1992, people were spraying their valuable water into the wind, or flood irrigating with uneven results. DripWorks has been an innovative leader as demand for and popularity of drip irrigation has boomed.

What are the benefits of Drip Irrigation?

Water: Drip irrigation is the most efficient method of watering today.

- Places a precise amount of water where you need it
- Prevents overwatering
- Results in less weeding
- Conserves water
- Saves money

Drip Irrigation Uses 30-50% Less Water

Time: Installing a drip system will not only save you water, but time.

- Eliminates hours of hand watering
- Can be fully automated with a timer
- Reduces weeding time

Drip Irrigation Saves You Time

Versatility: Drip irrigation systems can be used just about anywhere.

- Gardens, vineyards, greenhouses, row crops
- Existing landscapes
- Hillsides or flat terrain
- Long lasting and adaptable

Drip Irrigation is Versatile

Ancient Drip Irrigation

The origins of irrigation can be traced back to the ancient Egyptians, who in the 6th millennium BCE developed the technique known as "flood irrigation" by creating a network of canals to channel water from the Nile to their gardens. There is also evidence of irrigation systems arising in China during the same period and subsequently in the Andes of Peru during the 4th millennium BCE and parts of ancient India in the 3rd millennium BCE.

Reference to the use of buried porous clay pots that wept water into the surrounding soil goes back thousands of years in Egypt and China, and is considered the first form of drip or trickle irrigation (aka micro-irrigation).

Modern Drip Irrigation

The roots of modern day drip irrigation (pardon the pun) can be traced to 1860, when systems of clay pipes were developed in Germany for combination drainage/irrigation systems, used soon after in Afghanistan in 1866. In the 1920's this idea was expanded upon (again in Germany) utilizing a system of perforated clay pipes. The use of plastics after WWII led to the invention of plastic pipes with long flow paths by Australian Hannis Thill and a decade later to the development of the first plastic emitter by Simcha Blass of Israel.

Though many point to one person or another as the "Father of Drip Irrigation," it is clear that the road to present day drip irrigation method was built by more than one individual. As Dr. Daniel Hillel, recipient of the 2012 World Food Prize for his role in conceiving and implementing improved methods of food production with "micro-irrigation," said: "No one person invented drip irrigation."

Present Day Drip Irrigation

Today there is a huge variety of drip irrigation methods from which to choose: individual emitters and drip-pers, misters, micro-sprayers, mini-sprinklers, emitter tubings, and drip tapes. In addition, there is an entire realm of filters, pressure regulators, water timers, fertilizer injectors, tools, and accessories available to help install and maintain a drip irrigation system.

With drought in many parts of the country being a serious issue, drip irrigation has become even more relevant. If you're looking for a way to take action and reduce your water consumption, there is no quicker way to see results than installing a drip irrigation system. Drip irrigation will save you water, time and money.

Before Getting Started

Like all industries, drip irrigation has terms which can be confusing, especially to the beginner. Here are a few common terms you may find in this guide, our catalog, and on our website.

Glossary of Terms

Flow: 1) The amount of water available for the drip system expressed in gallons per hour (GPH) or gallons per minute (GPM). Flow is a determining factor in how many plants (or how large an area) can be watered at one time.

2) The total amount of water moving through the system as it exits emission devices.

Pressure: Measured in pounds per square inch, or PSI, pressure is the force pushing the flow of water. Your pressure can be determined by using a pressure gauge.

Constant Pressure: In a drip irrigation system, the condition that occurs when the spigot or valve is left open, leaving any downstream devices-timers, filters, regulators, tubing, fittings, and emitters-under constant pressure.

Dynamic Pressure: The fluctuating pressure that occurs within a drip irrigation system when valves are opened and closed and emitters turned on and off.

Water Source: Where the water originates. This can be a municipal system, a well, a pond, spring, or stream.

Point of Connection: Also known as a POC, your point of connection will be a spigot, hydrant, gate valve, or other connection that brings the water into your watering area.

Filter: A device used to remove particles from the water that might otherwise clog your emitters. Many water sources, especially municipal systems, are relatively free of debris. However, we still recommend filtration to ensure consistent, trouble-free operation of your system.

Zoning: The division of a drip irrigation system into areas that require similar watering rates or that would exceed the available flow of the system if watered together.

Mainline: Polyethylene tubing used to carry water from your POC to and throughout your drip system.

Branch Line: Polyethylene tubing that attaches to the mainline to bring water to an individual plant or to a zone. Branch tubing is generally ¼" or ½" tubing.

Pressure Compensating: (PC) Emitters distribute water equally throughout the whole system regardless of row length (within limits) and elevation changes. PC products are available in drippers, sprayers, or sprinklers.

For expanded definitions and other drip irrigation terms, visit our online glossary.

Getting Started

If you're new to drip irrigation and wondering how to get started, we highly recommend one of our complete kits. Most kits are available in Small, Medium, and Large versions (unless otherwise stated) and each kit is designed for a specific purpose. Everything required is included for you to quickly install a drip system .

Drip Row Crop Tape Kit

These kits use drip tape, an extremely efficient product that works best for long rows on terrain that is relatively flat. All of these low-flow Drip Tape Kits use longer-lasting, 15 mil tape with emitters spaced every 8" and will cover from 200'-4000' . If you have row crops these kits are definitely what you need.

Header Add-On Kits

These kits are available in 1/2" and 3/4" versions to make dividing your system into separate watering zones quick and easy.

Garden Bed Kit

As the name implies, this kit is perfect for framed or unframed garden beds. These kits use Soaker Dripline, 1/4" tubing with factory-installed emitters spaced at 12". Soaker Dripline is one of the most versatile drip irrigation products you'll ever use. This product is very flexible, and can be configured to accommodate a wide range of situations. Often used to water short rows in a bed, it can also be circled around a potted plant or spiraled around a small tree or shrub. Being a non-pressure compensating product, it can operate down to 2 PSI, making it ideal for low pressure and gravity fed watering situations.

Deck Garden Kit

The deck garden kit includes both 1/4" Soaker Dripline with emitters spaced every 12" and 1/2 GPH Pot Drippers. This combination of products can be used to water both large and small planter boxes and containers on a porch or deck. Whether your deck area has just a few flower pots or an entire kitchen garden these kits include everything you need to water 45 to 280 containers of varying sizes.

Rose & Shrub Kit

The Rose & Shrub Kit utilizes PC (Pressure-Compensating) Shrubblers to insure even watering at all points within your drip irrigation system. Mounted on convenient stakes, these emitters are easy to install and virtually maintenance free. At 30 PSI they output 8 GPH via 8 "fingers" of water that are emitted in a 12" diameter pattern. As with all our kits, everything you need to water your roses or shrubs is included.

Individual Plant Kit

Whether you're looking to water a group of containers or individual landscape plantings, this kit will meet your needs. Using a variety of 1 GPH, 2 GPH, and 4 GPH Take-Apart-Emitters (aka "Flag Emitters"), the Individual Plant Kit will water from 60 to 240 plants, depending on which version you choose. If you have lots of individual plantings scattered about, this is the kit for you.

Greenhouse Misting Kit

Designed to cover two 4' x 10' tables, the Greenhouse Misting Kit is ideal for seed propagation, foliage watering, and cooling. Each of the ten misters includes an anti-drip device to prevent dripping after the water is turned off. Like our other kits, this one has everything to get your greenhouse going. Though only one version of this kit is currently available, it is easily expandable from 10 to 40 misters.

DIY (Drip Irrigation Your Way)

Maybe you're the hands on type or you have some experience with drip irrigation but need more guidance than a brief product description and a few specs. If so, this next section is for you.

Step 1: Gather Information

1. Every drip irrigation system has a water source; municipal, well, pond, creek, stream, or irrigation ditch. If your answer is anything other than municipal, emitter clogging particulates may be a factor. Though we recommend a screen filter for any system, if your water source has high levels of algae or other organic matter, a disc filter may be required.

2. What is your point of connection (POC)? In most backyard gardens it will likely be some type of hose thread faucet, tap, or spigot. But if it's a hydrant, ball valve, or gate valve it may be a pipe thread connection. You'll need to know.

3. What area(s) do you want to water? A sketch of the garden should include distances from POC's to your watering areas. (it doesn't have to be fancy). This will help determine the amount of mainline and number of branch lines you need.

4. What is your flow rate. Knowing your flow rate is critical to sizing your system (knowing the pressure at your POC is also extremely helpful) .

Determining Your Flow Rate

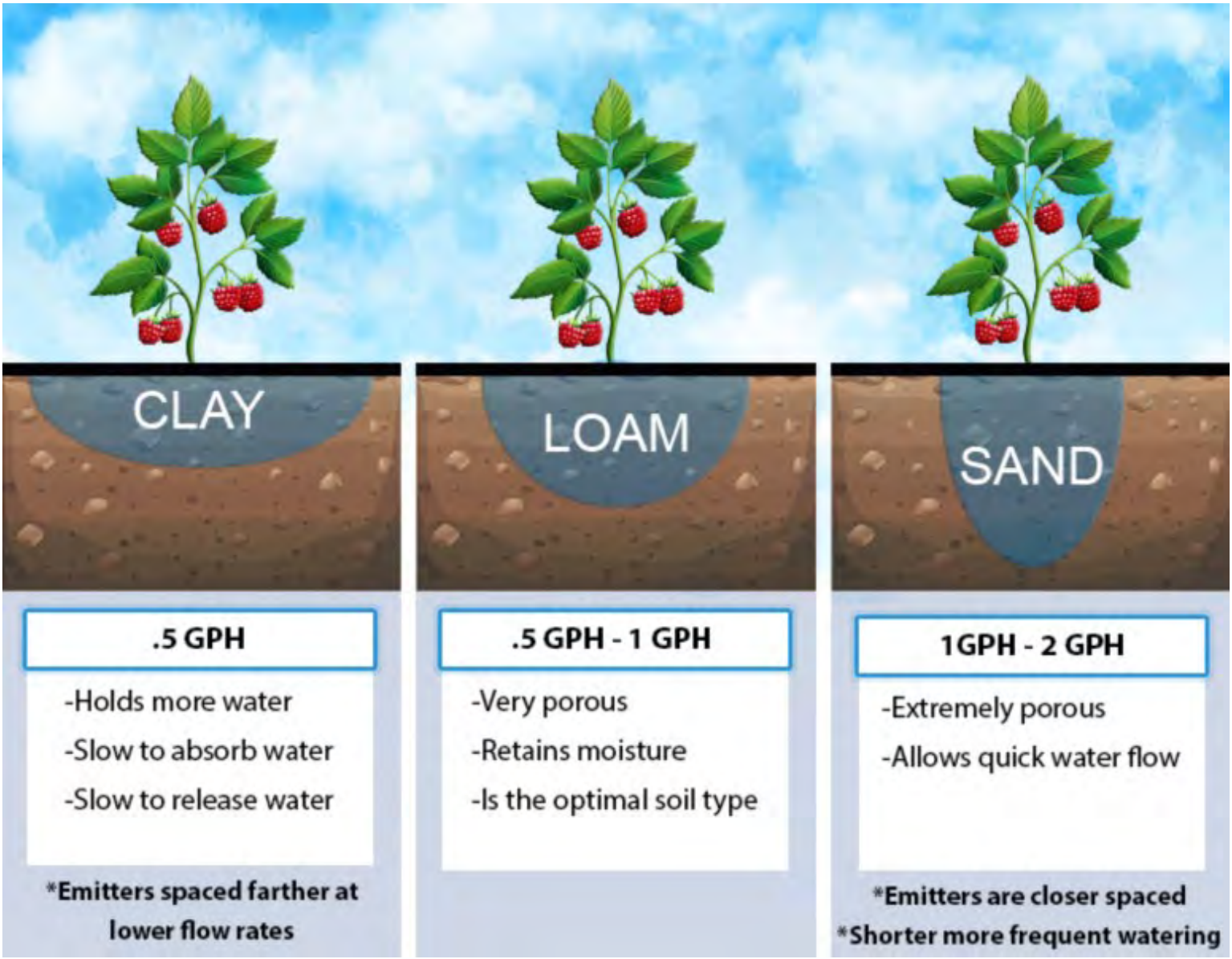
Seconds to fill a *1 Gallon Container	5	6	7	8	9	10	11	12	13	14
GPH	720	600	514	450	400	360	327	300	277	257
* If filling a 5 gallon container multiply the GPH x 5										

5. What will you be watering? Different plants have different watering requirements. Knowing what you are watering will be a determining factor in choosing what emitters will best suit your needs.

To determine the flow in gallons per minute (GPM) and per hour (GPH):
Place a 1 or 5-gallon container beneath the water source outlet, open the valve completely, and time the number of seconds it takes to fill the container.
(60 seconds per minute/ number of seconds to fill) x (number of gallons) = GPM

Or, use our online Flow Calculator.

Soil Types



Soil type is another factor that will determine what type of emitters you need. There are three main soil types, Clay, Loam, and Sand, each with a different absorption rate.

Clay absorbs water slowly, causing it to spread on the surface and form a roughly inverted cone shape below ground. For that reason, watering slowly with a 0.5 GPH emitter is best to achieve efficient penetration in clayey soils.

Loam absorbs water at an even rate, usually forming a cone-shaped pattern as it spreads below ground. A 0.5-1 GPH emitter is usually sufficient for loamy soils.

Sand absorbs water quickly in an almost straight down pattern. In most cases a 1-2 GPH emitter will provide the right amount of water to insure root coverage in sandy soils.

Step 2: Select Your Products

Use the following information to determine the type of drip system that is most appropriate for your garden. When selecting products for your system there are a few things to take into consideration, such as soil types and plant watering needs. For questions on a particular plant's needs, consult a local nursery or contact a horticulturist.

Basic Drip Emitters are lower cost and their flow will vary slightly depending on pressure. At low pressures basic emitters will flow more consistently than Pressure Compensating emitters. These emitters are used to water individual plants.

Pressure Compensating (PC) Emitters deliver a precise amount of water. They flow consistently from one emitter to the next regardless of changes in pressure or elevation. These emitters are self-flushing which makes them less likely to clog. Use these emitters to water individual plants.

¼" Soaker Dripline is a non-pressure compensating product that consists of ¼" poly tubing with built-in emitters spaced every 6, 9, or 12 inches. Its recommended use is in shorter garden beds and containers. Use for square foot gardening or in densely planted areas. This product is highly effective in lower pressure systems.

½" Inline Emitter Tubing consists of ½" poly tubing with built-in PC emitters. It is offered in a variety of spacing options and can be used in long rows, on uneven ground, and on hillsides. Use in densely planted areas or circle around root zones to water trees.

Drip Tape is best for long, straight row crops. It is the most economical way to water your plants and is easy to install and maintain.

Sprayers, sprinklers, and misters are used to distribute water over larger areas and work best for ground covers and densely planted beds.

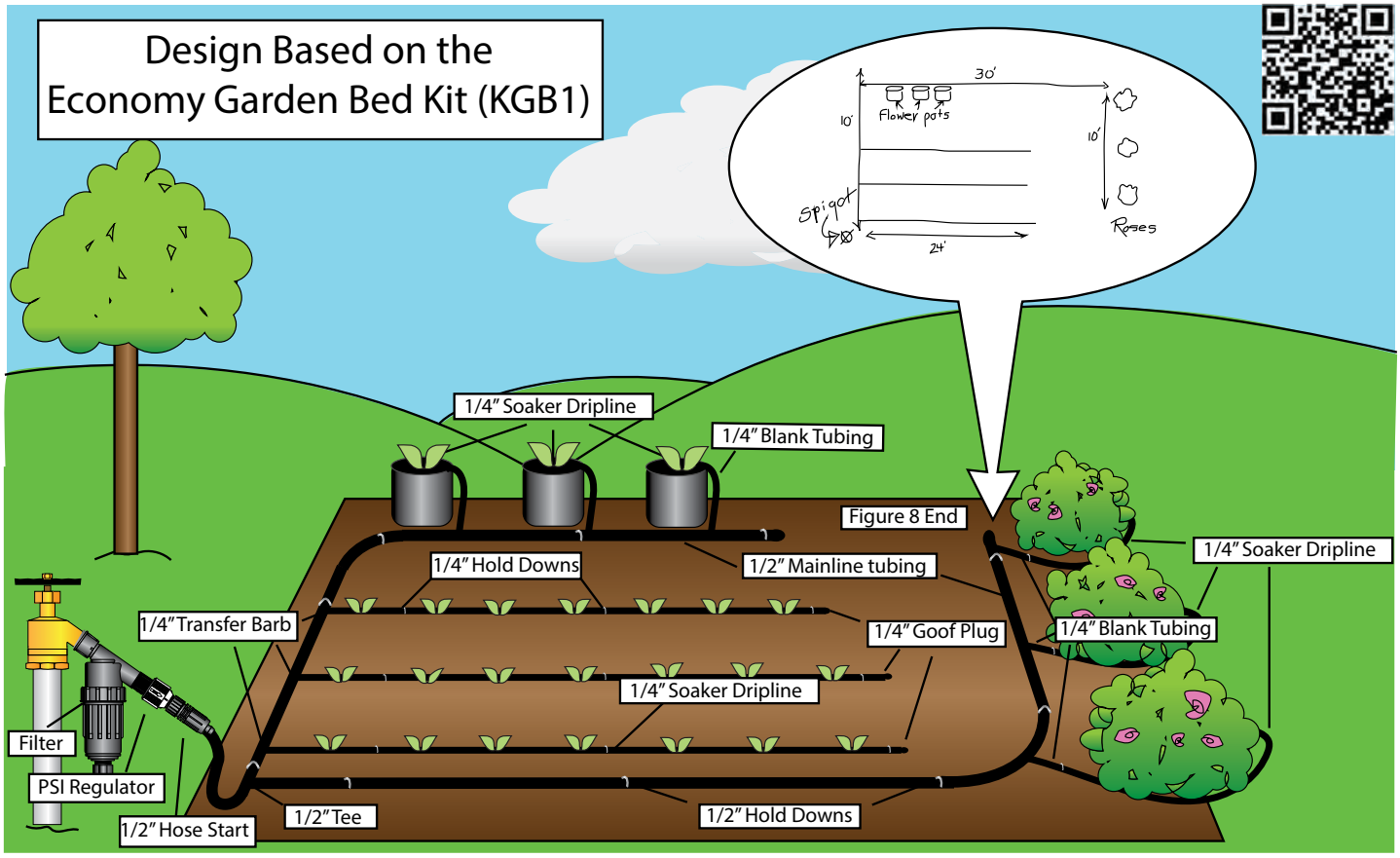
Micro-Jet | Pop Up | C-Frame Downspray | Bubbler | Shrubbler (Non-PC) | MP Rotator K-Rain Rotator | Sprayer Spectrum | Mini-Jet | Ein Dor

Step 3: Design a Drip System

Now that you have made a sketch of your garden and have chosen the products that fit your needs, another key factor in designing your drip system is your available flow. Flow will determine the number of plants or areas which can be watered at any given time.

Example: Let's assume an available flow rate of 240 gallons per hour (GPH). This means you can use up to 240 emitters with a 1 GPH output or 480 emitters that output .5 GPH.

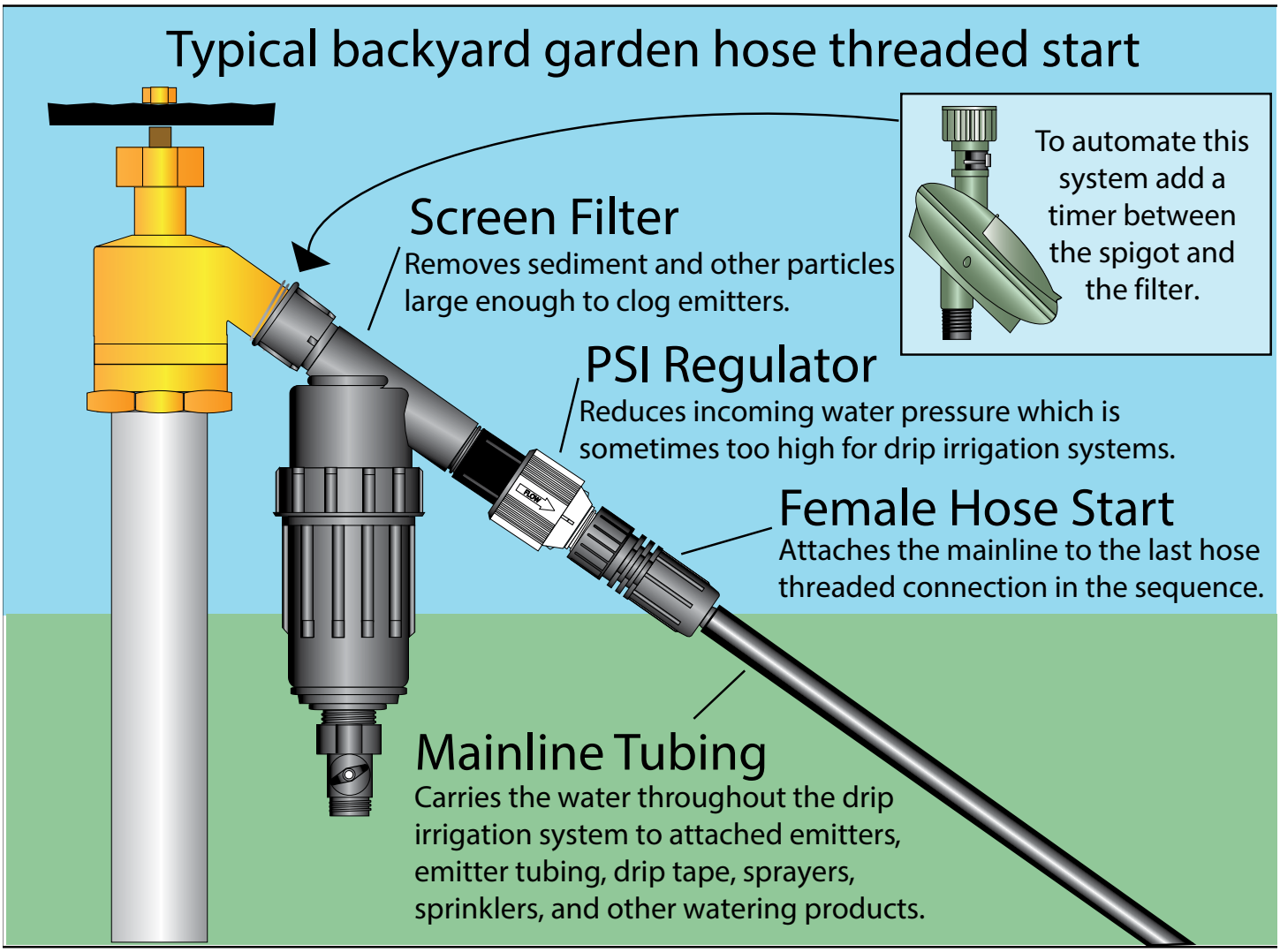
In addition to flow, it is helpful to know your water pressure—the force behind the flow. If your water pressure exceeds what your drip system needs or can handle, a pressure regulator will be required. A pressure regulator reduces incoming water pressure. See page 7 for instructions on how to determine your flow.



Turning Your Garden Sketch into Reality

After looking over the initial sketch (page 7) and considering the available drip irrigation products (page 5), 1/4" Soaker Dripline seems most suitable for a small garden of this type.

The **Garden Bed Economy Kit (KGB1)** includes a 100' roll of Soaker Dripline with emitters spaced every 12". This versatile product is ideal for the mixture of short rows, containers, and small shrubs we find in this situation and the kit includes everything required to quickly get your garden up and running.



Installation Tips

• Before rolling out the mainline, warm the roll of tubing in the sun or inside the house to make it more pliable

• When installing your drip lines, consider mulching over them. This will increase the tubing's lifespan and help protect it from environmental hazards.

• Once the mainline and supply lines are installed, it is recommended that you flush your lines with clean water for a minute or two (you can collect and reuse it!) before installing emitters or bringing the system up to pressure. This will remove any debris in the lines.

• Add a backflow prevention device. Local codes often require a backflow prevention device to protect your personal and municipal water supply from contamination.

•Automate your system with a battery (DC) or electric (AC) timer.

How to Use Easy Loc Fittings

Determining the number of watering zones

The number of zones required is determined by available flow and/or the watering needs of different planting groups that require their own watering zone. For instance, if your 1/2" mainline tubing, which carries about 240 GPH, is feeding emitters with a total flow of 325 GPH, the system should be divided into 2 watering zones.

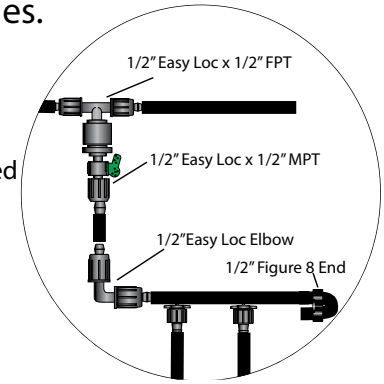
The Galcon Alternator Valve

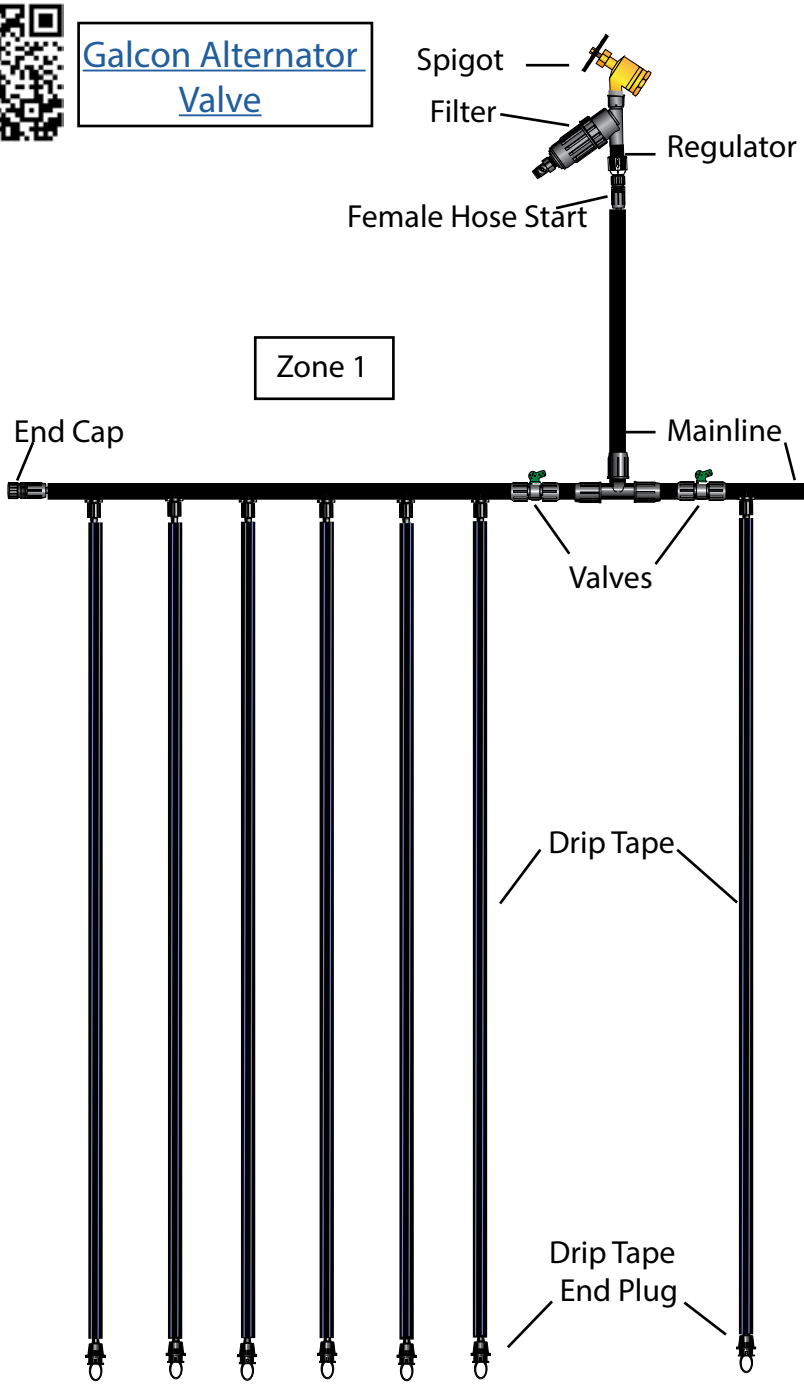
The alternator valve makes it fast and easy to divide your flow into two zones.

Galcon Alternator Valve

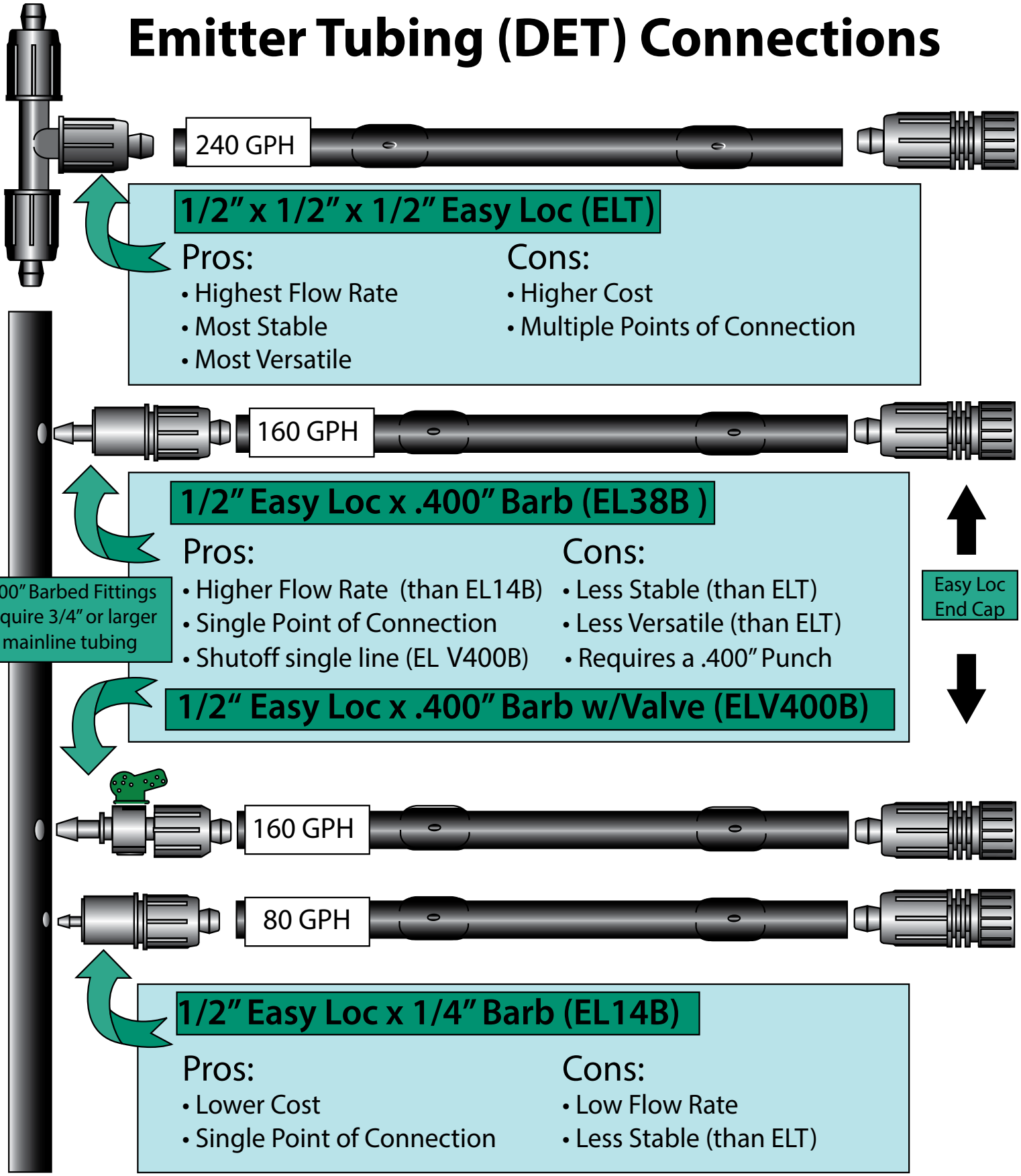
Header Packages

Headers quickly divide your system into zones by creating submains. Available in 1/2" or 3/4" - Tubing not included



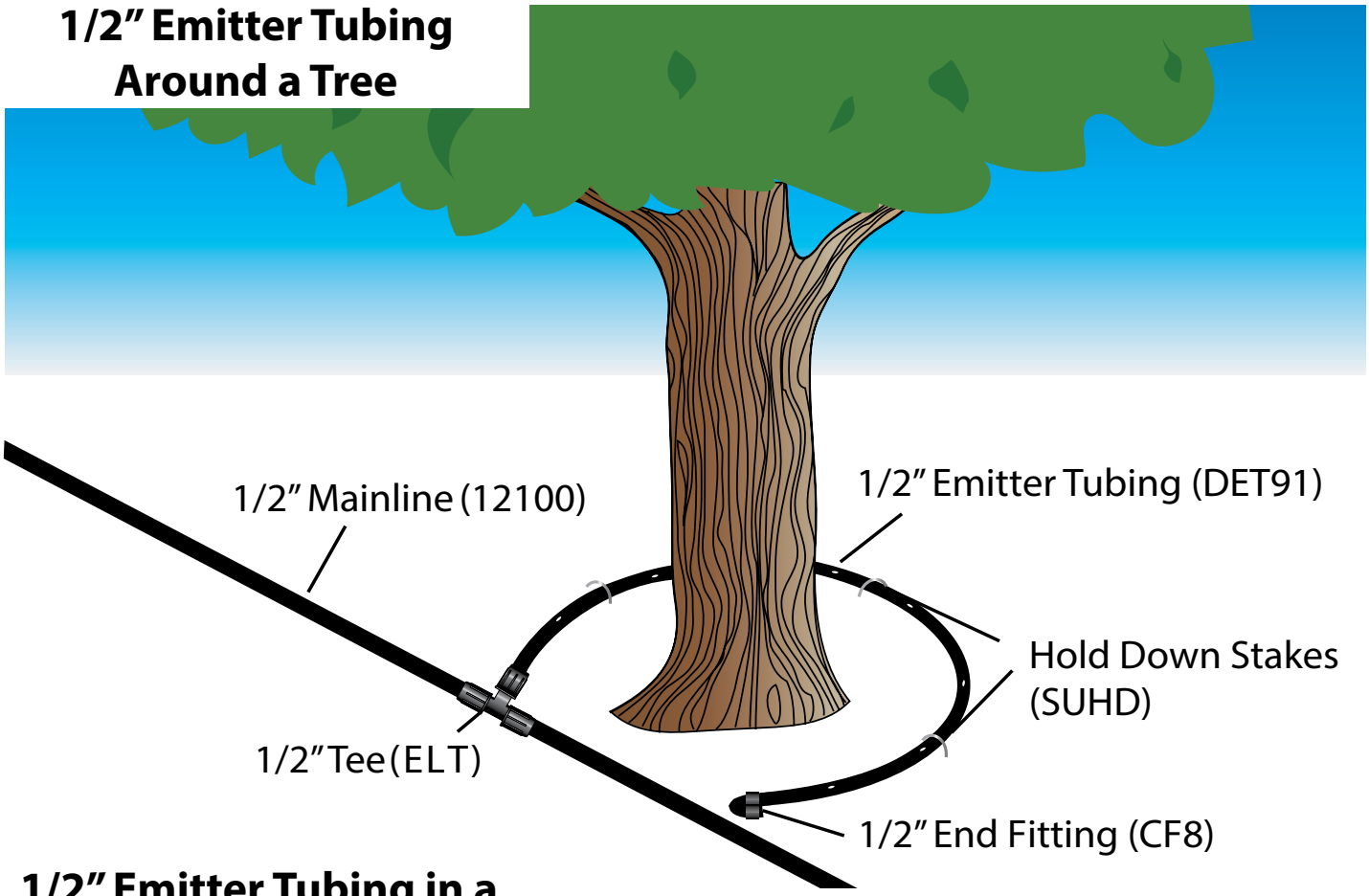


Emitter Tubing (DET) Connections

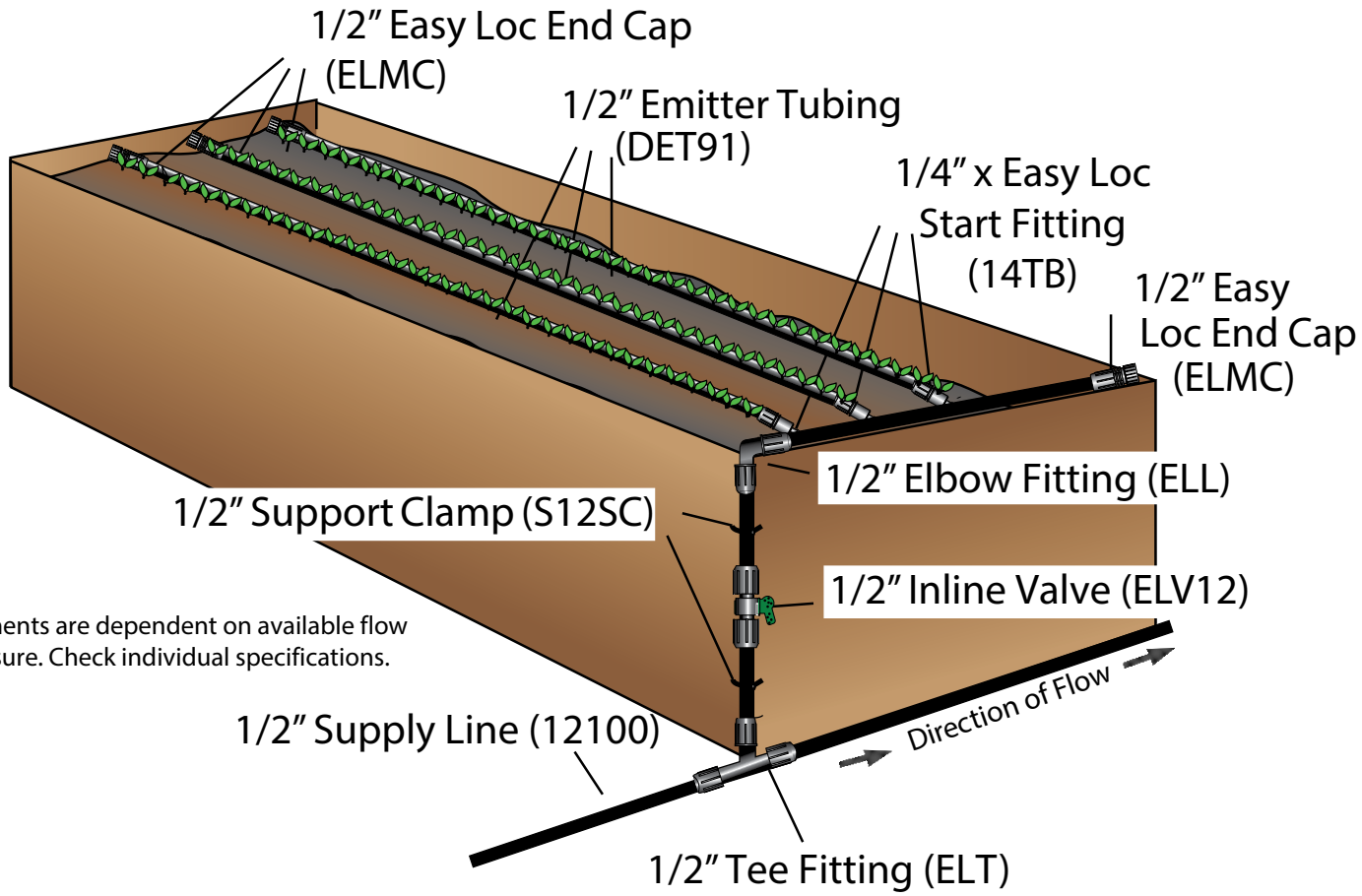


1/2" emitter tubing is available with a variety of spacings, roll lengths and the 9" and 12" spacing offer 1/2 GPH or 1 GPH options.

1/2" Emitter Tubing Around a Tree



1/2" Emitter Tubing in a Framed and Raised Bed



*Components are dependent on available flow and pressure. Check individual specifications.