

N E T A F I M

Subsurface Irrigation

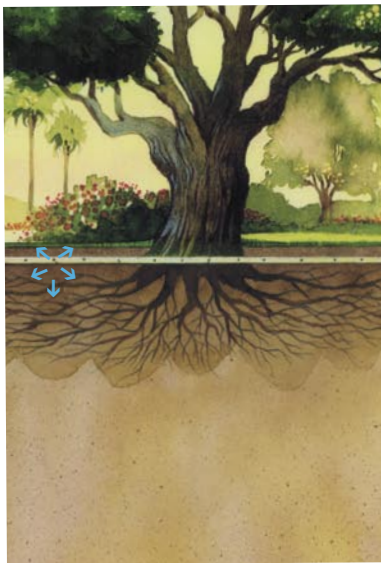
**Fact
vs.
Fiction**



The Nature of Soil, Water & Plants

Understanding the Relationship Between Soil, Water and Plants is the First and Most Critical Step in Knowing How to Design a Water Efficient Irrigation System

When applied slowly to the soil at a single point, water moves through the soil in three ways:
1) Downward, pulled by gravity
2) Outward and
3) Upward, pulled by capillary action.



Important Definitions:

Capillary Action: The radial (outward and upward) movement of water through the soil that fills the spaces between particles with capillary moisture.

Capillary Moisture: The water held in pore spaces by the surface tension between the water and the soil particles. This is the primary source of water for plants and is also referred to as “available moisture”.

Gravitational Water: Free water in the soil which moves downward due to gravity. After a soil has been saturated, the gravitational water percolates downwards, leaving the soil at field capacity.

Field Capacity: As much water as the soil can hold against the influence of gravity. If a soil is saturated by rainfall or irrigation and then allowed to drain freely for 24 hours, the soil is usually at field capacity.

Infiltration Rate: The rate at which water enters the soil. This rate varies greatly, and may impose a limitation upon the design of an irrigation system since water application rates in excess of the infiltration rate may result in runoff and erosion.

Fiction: “Water only moves downward through the soil, pulled by gravity.”

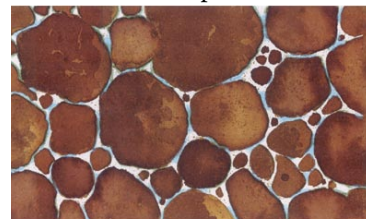
Fact: When applied slowly (as in drip irrigation) water radiates outward from its source point, creating an overlapping wetting pattern beneath the ground. See the “wetted pattern” illustration on the opposite page.

Fiction: “Plants need to be watered from overhead to wash off dirt and dust.”

Fact: A report issued by independent test lab, C.I.T. (Center for Irrigation Technology), states that “... although the [subsurface] research plots are surrounded by fallow fields, dirty leaves have not been noted.”

Fiction: “Subsurface irrigation won’t penetrate clay soils.”

Fact: In fact, subsurface works better in heavy clay or sand conditions than sprinklers.



What most people regard as “heavy clay” and “sandy” soils are actually mixtures of sand, silt and clay which will still allow for adequate water movement and retention between soil particles.

Even “heavy clay” and “sandy” soils are a mixture of sand, silt and clay. Loam, which contains equal proportions of sand, silt and clay, is ideal. *However, plants can thrive in a very broad spectrum of soil textures when subsurface watering is applied at the proper rate, with appropriate spacing.*



The Evapotranspiration Cycle: Sun and wind evaporate water from both soil and plant. Water and nutrients are absorbed by the plant roots and are passed upward to the leaves where the nutrients are absorbed and moisture is evaporated.

How Subsurface Irrigation Really Works

Netafim Techline® CV — the world's most advanced subsurface drip irrigation system — has established a proven track record in every application that traditional sprinklers have been used. In fact, irrigation professionals agree that Netafim's Techline® CV is more effective than sprinklers in hard-to-irrigate "problem" areas, including shrub and bedding plant areas, median strips, parking lot islands and high traffic turf areas.

Netafim Techline® CV is the most efficient irrigation product in the world today because it combines the water-saving features of pressure compensating drippers, continuous self-flushing of drippers and check valves.

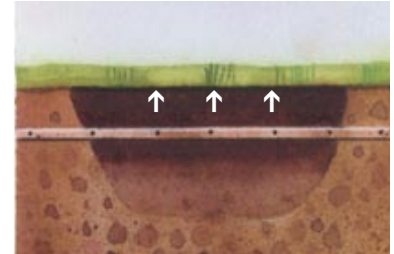
What Does That Mean?

Pressure compensation ensures that all of the drippers inside the Techline CV dripperline are emitting the same amount of water. Continuous self-flushing ensures that even if some debris gets into a dripper, it is purged *immediately*. The Check Valve feature adds the next level of water conservation to your irrigation system. When the zone shuts off, the drippers close themselves, thus holding the water in the tubing. This prevents the water from escaping as wasted water and ensures that the next time the zone operates, the dripperlines do not need to be refilled with water before they begin running. This feature alone can save hundreds or thousands of gallons of water annually, even on a small system.



Above: Typical wetting pattern shapes in different soil textures. Note the dramatic overlap ensuring total coverage throughout varying root zone depths.

Above: Techline CV pressure-compensating drippers are fully self-contained units molded to the interior wall of the dripper tubing itself. Both tubing and dripper housing are manufactured from high quality polyethelene to withstand chemicals and fertilizers.



Because water travels both upward and outward from the dripper, the soil will usually be noticeably damp at, or close to, the surface.

Fiction: "There's no way to tell if a subsurface drip system is working."

Fact: There are several different ways to "see" that your system is working, including:

1. Feel for moisture just below the surface of the soil directly above a dripper.
2. Run micro tubing to the surface at the end of a zone and use it as a point source dripper.
3. Monitor flows at the water meter.

For more Facts, not Fiction, see back.



SUBSURFACE IRRIGATION

MOST COMMONLY ASKED QUESTIONS

Questions

Answers

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1. Why is Subsurface Irrigation a better way to irrigate than a spray and rotary system?

When you use spray and rotary sprinklers you use lots of water. When you use products like Netafim Techline CV, you save water. Lots of it! That's because the water moves slowly through the soil profile, not through the air. So virtually every drop is used rather than running down the street, evaporating before getting to the plants' roots, hitting the wrong places, being effected by wind and pressure, etc. And unlike sprinklers, it can adapt to any landscape shape because it is flexible. Even slopes and hard water areas are not a problem.

 2. How is the dripperline installed into my yard?

There are a variety of methods your contractor can use. If your yard has not been planted yet, simply laying the dripperline out and covering it with soil before laying sod or seeding is fast and economical. If the area is already planted, such as an existing lawn, a narrow-bladed trencher or special vibratory plow that buries the tubing in even rows may be used.

 3. What if someone damages or cuts through a section of Techline CV tubing? Can I spot it right away, and is it easy to fix?

If the tubing is accidentally severed, it is easy to tell because a puddle forms directly overhead. To repair a length of tubing you simply cut out that section and attach a new section with a Techline CV barbed fittings. Other than a knife, no tools or glue are needed.

 4. When I install Techline CV under turf, will I get green and brown stripes?

No. A properly installed Techline CV turf installation will give you more consistent watering and excellent turf quality with less chance of disease and water stress.

 5. What about "root intrusion"? How do I prevent roots from growing into the drippers?

Root intrusion is a problem that can be effectively managed using three different practices, listed below. Following any of them will help. Using all of them will assure a lifetime of protection.

- ◆ Use Netafim Techline CV dripperline since it is the only subsurface irrigation product designed with a physical root barrier proven most resistant to root intrusion in tests conducted by the renowned Center for Irrigation Technology (C.I.T.)
- ◆ Apply some water every day. Running your Techline CV system for even several minutes a day (more may be required depending on your local climate) will help keep soil moisture constant so the roots do not seek additional water.
- ◆ For the *ultimate protection* against root intrusion use the Netafim Techfilter, with replaceable cartridges.



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