

TORO

Count on it.

Drip In[®] with ROOTGUARD[®]

Micro-Irrigation



The **ROOTGUARD**[®] Advantage

- **Higher Yields**
Water and nutrients delivered directly to the root zone at regular short intervals, promote healthy plant growth and reduce stress.
- **Substantial Water Savings**
Improved irrigation system efficiency, combined with the ability to schedule short and frequent irrigation run time rates eliminate run-off as well as deep percolation.
- **Healthier, Better Quality Crops**
Soil surface and foliage is kept dry, reducing fungal diseases caused by moisture on the soil surface and resulting high humidity in the canopy.
- **Further Water Savings**
Water loss due to evaporation is eliminated. As less water is applied overall, so is less salts, found in the water, applied.
- **Improved Soil Aeration**
Fine soil particles are not washed down, decreasing soil compaction and thus improving root growth.
- **Fewer Chemicals**
Large volumes of irrigation water do not wash fungicides, insecticides and herbicides away.
- **Fewer Weeds**
A dry soil surface reduces germination.

More ROOTGUARD Advantage:

- **Longer Irrigation System Life**

The Drip In emitters and tubing are made with durable polymers. When placed underground the system is protected from damaging ultra violet rays and temperature fluctuations. The lack of evaporation around the subsurface dripper also eliminates any chemical build-up such as bi-carbonates. It has been noted that Drip In with ROOTGUARD® deters clogging normally associated with bacterial slime build up in the drip emitter. The absence of light at the drip emitter outlet orifice also eliminated any possibility of algae growth in the last section of the dripper flow-path. The system is a solid set subsurface system that eliminates any irrigation handling and subsequent damages.

- **Safe and Efficient Delivery of Fertilizer & Insecticides**

Chemicals are directly applied to the roots with subsurface drip reducing possibilities of surface contact

- **Less Animal, Human and Mechanical Damage**

No surface risers or drip lines that can cause injury, or be subject to damage by operators during cultural and harvest practices or animals such as coyotes.

- **Labor Savings**

Less weed and disease control as well as less maintenance means proportionally less labor.

- **Larger Soil Volume Irrigated**

Given that water is conveyed in soil through capillary action as well as gravity, the subsurface drip emitter allows water to also move upward in all directions, resulting in a volume up to 46% larger to be irrigated.

- **Dry Soil Surface**

With a dry soil surface, all cultural and harvest practices can take place irrespective of irrigation scheduling.



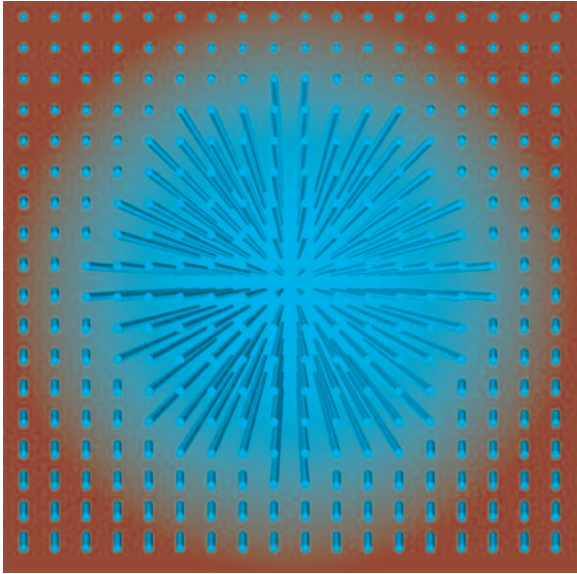
Subsurface Drip Irrigation

With traditional drip irrigation, the drip tubing and drip emitters are installed above ground. In the infancy of drip irrigation (30 years ago), given the style and quality of equipment used, this was a wise choice. Today, with the new generation style turbulent drippers, (both pressure compensating and non-compensating) accepted filtration standards and maintenance schedules, most of the fears of emitter clogging have disappeared. The only remaining barrier against long term, successful, subsurface drip irrigation system has been root intrusion.

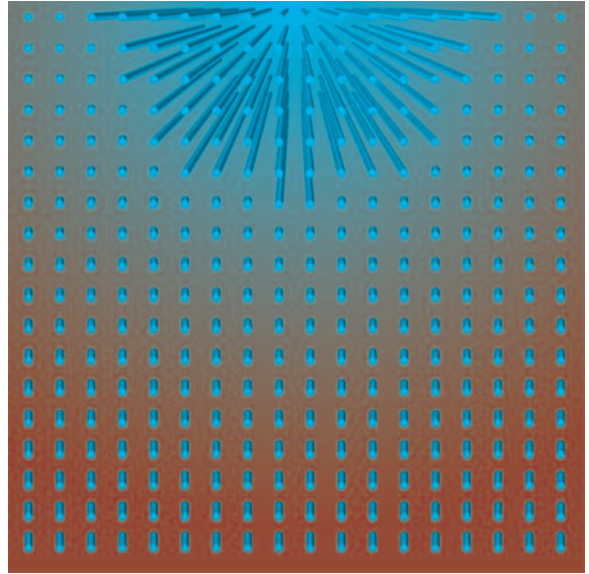
*Drip In® is a registered trademark by Toro Ag Irrigation
Treflan® is a registered trademark by Dow Agro Sciences
ROOTGUARD® is a registered trademark by A.I. Innovations*

Drip In ROOTGUARD® is the key to subsurface drip irrigation success. ROOTGUARD technology combines Treflan® with the drip emitter to inhibit root growth. This is patented technology by Geoflow, Inc. where the herbicide is released at a uniform rate over a long period of time. It maintains a sufficient concentration in the soil immediately surrounding the drip emitter, to prevent longitudinal root growth into the dripper. Built-in ROOTGUARD protection is guaranteed for 10 years by Geoflow, Inc. to prevent roots from growing into these impregnated subsurface drip emitters.

Comparison Table



Subsurface drip



Surface drip

Given the same amount of water, Subsurface Drip Irrigation Covers a 46% larger wetted volume of soil than a surface drip system. This decreases the saturation point of the soil than a surface drip system. This decreases the saturation point of the soil, which not only leaves room for more air, but also improves the capillary movement of water and decreases the water lost to deep percolation.

Research performed by the US Department of Agriculture/ARS Fresno

System Engineering Practices

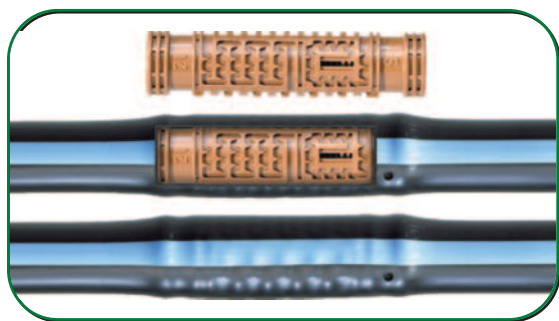
Subsurface drip irrigation systems use the same basic components as surface drip irrigation systems. This includes water filtration and treatment, fertilizer and chemical injection, air vents for both air and vacuum relief, flush valves and manual or automatic control. In addition to the above all ROOTGUARD® subsurface systems need to be equipped with vacuum relief on all drip lines at the high points (elevation) to avert dripper logging from ingesting soil particulate during system shut down.

Any organic fertilizers, soil additives and/or water treatments injected through Drip In with Rootguard is not recommended and will void the warranty."

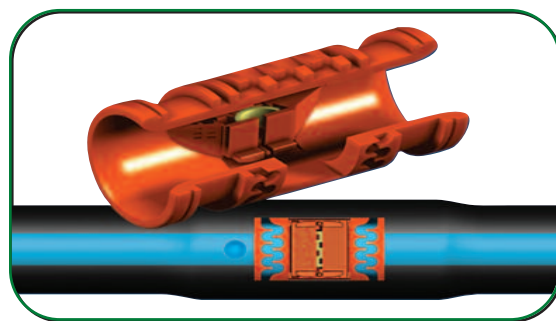


Drip In® Dripline

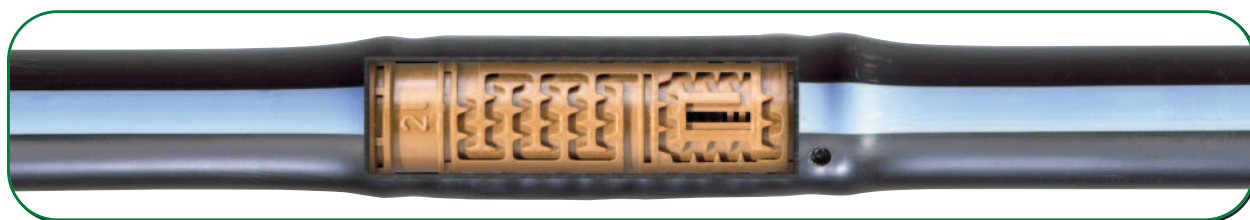
Subsurface Dripline with the **ROOTGUARD®** Advantage



Drip In® Classic®



Drip In® PC



Drip In Dripline Advantages:

The In-line Emitter

is a labyrinth type, turbulent flow dripper. The emitter is enclosed and inseparably welded to the inside wall of the tubing as it is extruded in the manufacturing process. This emitter has enjoyed over 25 years of reliable performance in a variety of applications.

Drip In Dripline

is a one piece, jointless emitter enclosed tube. It is rugged, lightweight and very flexible. It can be laid out and re-rolled easily with no damage to the in-line emitters. Only the highest quality resins are used. Drip In® dripline is the most effective and economical choice for permanent or row crops. Classic dripline now comes with the Toro Ag Irrigation **Blue Stripe®** of quality.

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