

SUB-SURFACE DRIP IRRIGATION SYSTEM COMPONENTS

Sub-surface drip irrigation systems use the same basic components as surface drip irrigation systems. This includes water filtration, fertilizer and chemical injection, main and sub main pipes, drip lines, air vents, flush valves and other manual or automatic control valves. In addition to the above, sub-surface drip irrigation systems need to be equipped with vacuum relief on all drip lines at the high points to protect dripper clogging by soil particles during system shut down. Also special drippers should be used to protect root intrusion into the drippers.



Nano-ROOTGUARD ADVANTAGE

With the new generation PC & AS turbulent flow drippers, improved filtration systems and use of efficient irrigation designs, sub-surface irrigation became possible years ago but the fears of root intrusion remains always as a barrier for a long term successful applications.

ROOTGUARD is the key to Geoflow's success with sub-surface drip irrigation. **Nano-ROOTGUARD** technology combines Rootguard with the emitter to inhibit root intrusion. This is a patented technology by Geoflow Inc. where the **Nano-ROOTGUARD** 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 root intrusion into the dripper.

With **Nano-ROOTGUARD**, latest version of **ROOTGUARD** technology, protection against intrusion of roots into these impregnated sub-surface drip emitters is guaranteed by GEOFLOW minimum 10 years.

GEOFLOW SUB-SURFACE DRIP IRRIGATION PIPES

Geoflow is the first and sole supplier of sub-surface drip irrigation pipes with GEOFLOW Inc. license and patented **Nano-ROOTGUARD** technology in Turkey and neighboring countries.

Geoflow sub-surface drip irrigation pipes are available with 16mm, 20mm and 22mm diameters; 1,2 - 1,6 - 2,1 & 3,5 l/h flow rates, various wall thicknesses and any required dripper distance.

By the help of **Nano-ROOTGUARD** technology, Geoflow sub-surface drip irrigation pipes can be used reliably for a minimum 10 years long life time without need of any maintenance especially in vine yards, olive plantations and orchards, production of alfalfa and many other plants as well as landscaping purposing.

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Nano-ROOTGUARD®

GEOFLOW ^{TR}
Subsurface Drip Irrigation Inc.



**Sub-surface
Drip Irrigation
System**

**Great
Solution for
Root
Intrusion**

GEOFLOW ^{TR}
Subsurface Drip Irrigation Inc.

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GeoflowTR
Attaroglu & Geoflow partnership.

10 years warranty

What is sub-surface drip irrigation?

While in conventional drip irrigation systems the drip lines are installed above ground, sub-surface drip irrigation lets the drip lines to be buried below ground for a long, trouble-free life.

Geoflow sub-surface drip irrigation pipes supplied by **Nano-ROOTGUARD®** technology, allows the precise application of water, nutrients and other agro-chemicals directly to the root zone of plant. This allows the farmer to optimize the growing environment and leads to higher quality and quality crop yields.

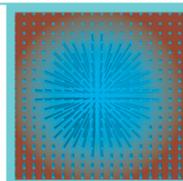
In sub-surface drip irrigation systems, the depth and placement of sub-surface drip lines is determined by the soil composition and the crop requirements. An efficient installation has water moving by capillary action at a depth of 30 to 60 cm beneath the surface, forming a continuous wetted area along the plant rows. Frequent irrigation cycles (several times daily) maximize capillary action and minimize water surfacing.

Geoflow is the first and only supplier of sub-surface drip irrigation systems in Turkey and neighboring countries with **Nano-ROOTGUARD** and **ROOTGUARD Band** technology.

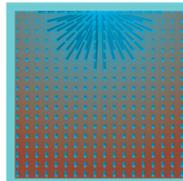
Comparison Table

Water distribution 10 hours after 1 hour of watering.

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



Sub-surface dripline



Surface dripline



* ROOTGUARD, is a registered trade mark of A.I. Innovations.
** Research performed by the US Department of Agriculture.



WHY USE SUB-SURFACE DRIP IRRIGATION?

- Higher Yields**
 Water and nutrients delivered directly to the root zone promote healthy plant growth and reduce plant stress.
- Healthier, Better Quality Crops**
 Soil and foliage are kept dry, reducing fungal diseases caused by surface and overhead irrigation.
- Safe and Efficient Delivery of Fertilizers & Insecticides**
 Chemicals are directly applied to the roots with sub-surface drip irrigation, reducing chemical pollution from leaching into the aquifer.
- Fewer Weeds**
 A dry soil surface reduces germination.
- Improves Soil Aeration**
 Fine soil particles are not washed down, decreasing soil compaction and improving root growth.
- Substantial Water Savings**
 Water loss due to evaporation, mist, surface runoff or wind interference is eliminated.
- Less Salt**
 Use of less water also means less salt in the soil or in the aquifer.
- A longer or Extended Irrigation System Life**
 The PC & AS turbulent flow drip emitters and tubing are made with durable polymers. When placed underground the irrigation system is protected from damage caused by ultraviolet light, temperature fluctuations and damage due to cultural operations. The lack of evaporation around the sub-surface dripper also eliminates any chemical build-up such as bi-carbonates. The absence of light at the drip emitter outlet orifice also eliminates possibility of algae growth in the last section of the dripper flow path. Plus, **Nano-ROOTGUARD** deters clogging minimum 10 years.
- Less Animal, Human or Mechanical Damage**
 No risers or surface drip lines that can cause injury or be subjected to damage by cultural operations, animals or harvest activities in the field.
- Lower Maintenance Costs**
 The system is installed permanently below cultivation depth, and requires no handling.
- Fewer Chemicals**
 Fungicides, insecticides and herbicides are not washed away by irrigation water.
- Labor Savings**
 Easier fertilizer application, less weed and disease control and less maintenance means less labor. Also there is no need to collect drip lines at the end of season and reassembly in next irrigation season.