Master the Art of Growing Higher Yielding Hemp with Drip Irrigation

Rivulis

www.rivulis.com

Hemp: A Versatile Plant with Countless Possibilities

Industrial hemp farming is experiencing a renaissance in many parts of the world where consumer demand for hemp-derived products continues to grow.

Hemp can be cultivated for a wide-range of applications that can bring farmers new business opportunities with potentially high returns on investment. Keep in mind that cultivating industrial hemp requires careful planning from seed to harvest with drip irrigation being the key component for a productive and high yielding crop. This brochure will look at industrial hemp production for seed and oil, including maximizing CBD content.

Why Consider Drip Irrigation for Hemp?

Better Germination

Plants like frequent water applications to keep the soil moist for seed germination. This minimizes risk of seeds rotting due to soil saturation. For transplants, drip irrigation manages the water flow to provide multiple light, frequent applications of water and nutrients.

Better Crop Growth

The use of drip tape allows injecting nutrients directly to the root zone. These nutrients applied at the proper time are essential for the plant to grow properly and maximize yields. Through drip irrigation, water is delivered at a slower rate than other types of irrigation, such as sprinklers and pivots. This means that the soil is kept moist but not saturated keeping a balance of air and water at an optimal rate for growth. Reducing surface applied water decreases unwanted weed germination and growth.

Better Foliage Development

Drip irrigation delivers water to the root zone unlike overhead irrigation which can deposit an excess of water on the foliage that can lead to fungal growth and disease that cannot be treated because no US herbicides, pesticides or fungicides are approved to be used for hemp by the USDA.

Healthy Plant vs Plant with Mold

Easier Access to the Field

Overhead irrigation keeps the land wet making walking the fields more difficult, particularly for weeding or inspecting for male plants that need to be pulled out so they do not pollinate the female flowers and create seeds which can greatly reduce the CBD yield.

Best Practices for Drip Design with Hemp in Mind

Your drip system design must be able to provide a constant and consistent flow at the pressure required by the drip equipment. The design must match your availability of water and pressure and must do the job economically over the life of the system, reducing labor costs and returning a profit through increased yields, improved crop quality and water savings.

Follow these 3 steps for a successful hemp irrigation design

1 Accurate Measurement of Your Field

- Accurate measurements of your field dimensions and topography are necessary for a good system design. It will help the designer to determine block size, direction of flow and expected uniformity.
- Invest in good surveying equipment. Progressive designers rely on Global Positioning system (GPS) equipment to assist in achieving accurate results.

2 Water Availability and Quality

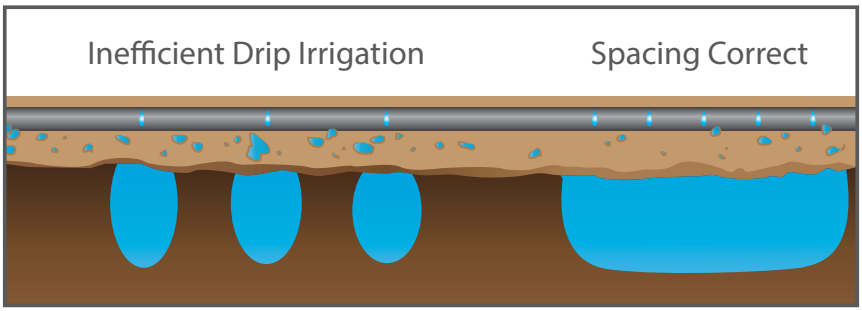
- Know how much water is required for your field and then check your water source to ensure that the crop peak demand can be met during the available irrigation run time.
- Make sure you know your water rights as this will affect availability
- Test your water for chemicals, organics and non-organic silts. This will determine the type and size of filtration.
- Test pressures and water level fluctuations to ensure that the correct amount will be available throughout the growing season.

3 Drip Tape/Drip Line Selection

- Drip tapes/lines offer you the most flexibility for emitter spacing and flow rates. Selecting the right tape or drip line configuration will depend on several factors such as plant location, row spacing, topography, row length, soil type and installation depth desired.

Plant Spacing

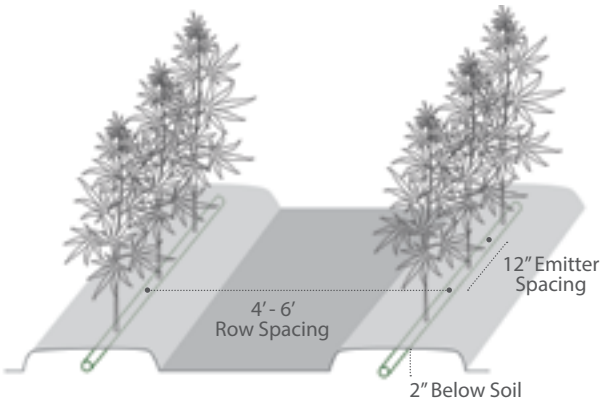
Drip emitters should be spaced equal to or closer than the plant spacing but not wider. In wide spacing situations, it is best to pick relatively closer emitter spacing of 12" so that the tape or drip line can apply water between plants for root growth.



Most hemp plants being grown for cannabinoids will be planted 4' – 6' apart along the rows to allow for plant growth without interference to achieve optimum tonnage per acre.

Row Spacing

The laterals must be close enough to each other and to the plant to be able to provide the adequate amount of moisture and nutrients to the root zone where it is the most beneficial to the plant. It is recommended for hemp plants being grown for cannabinoids to be planted in 4' to 6' rows to allow easy access to the field. Hemp plants grown for fiber can be planted more densely since they are smaller and more compact. Avoid placing tape laterals too far apart to save money unless the drip system is only being used for supplemental irrigation.



Topography

Rows with steep downhill slopes may require the installation of pressure compensating drip lines to maintain proper water flow from one end of the field to the other. Rows with uphill slopes may need higher operating pressures or lower flowing emitters to achieve 90% emission uniformity. Higher crop uniformity can lead to higher yields.

Row Length

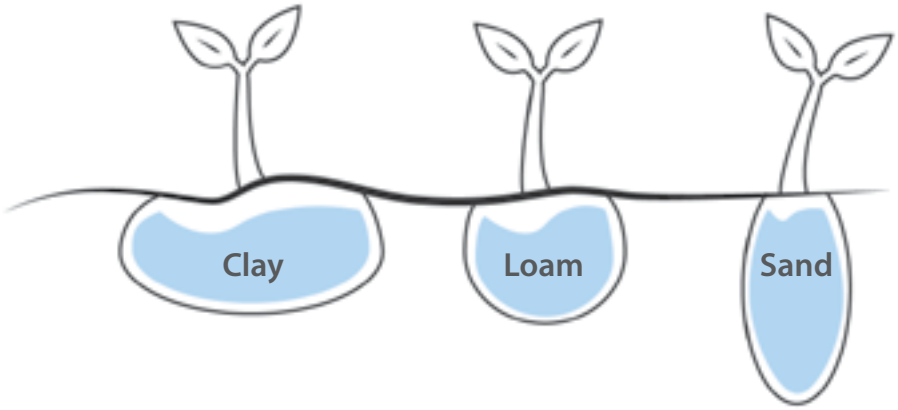
Row length depends heavily on tape diameter. For hemp, Rivulis recommends a 5/8" diameter which allows for row length of 300 – 650 ft. Depending on flow rate. For longer lengths of run up to 1,200', a 7/8" diameter is recommended.

Mulch

Combining drip tape/ line with mulch can help control weeds and reduce labor.

Soil Type

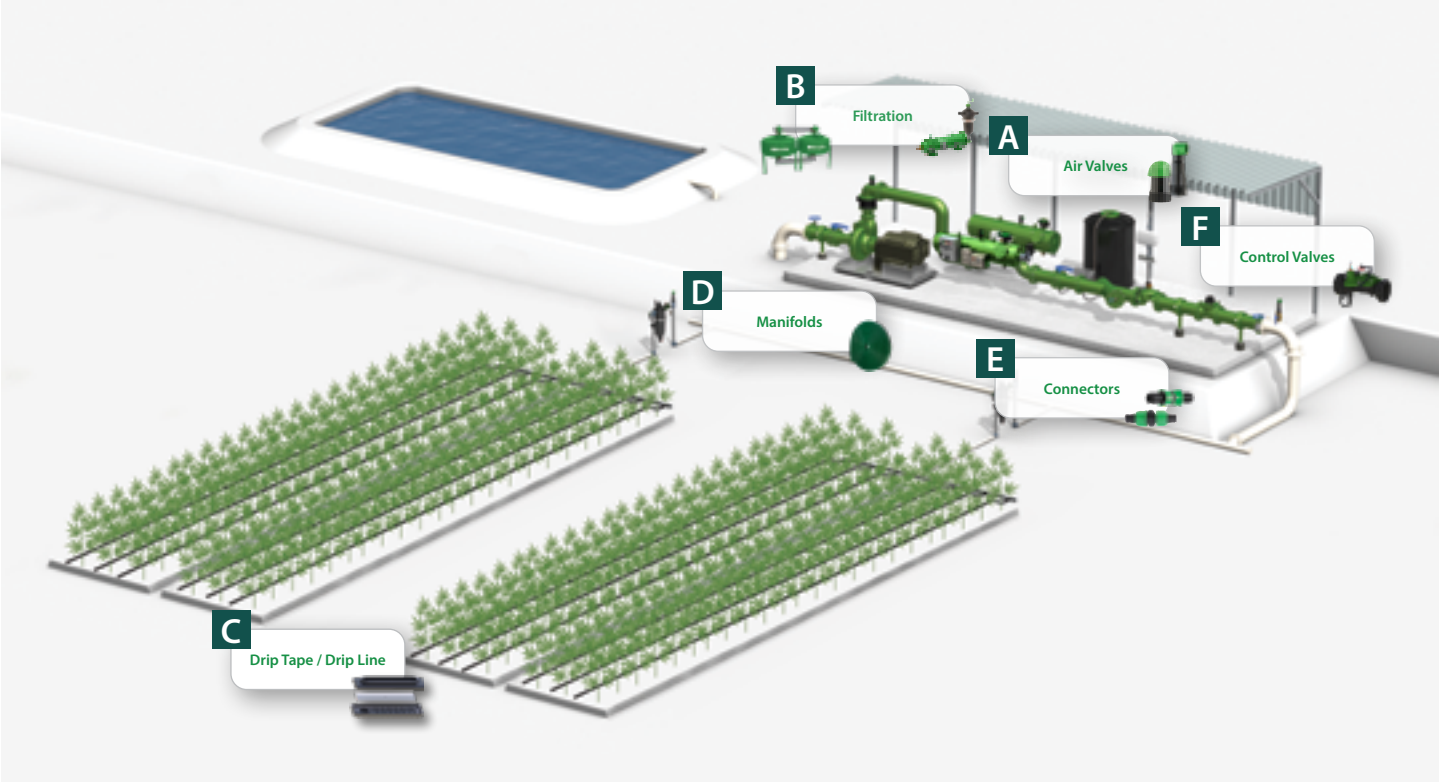
Hemp thrives best on sandy soils that are well-aerated. If you have clay soil, you will require lower flowing emitters. Match the flow rate of your drip tape/line to the infiltration rate of the soil. Do not exceed the infiltration rate and create run-off from your fields.



Installation Depth

On hemp installations the tape/dripline is nearly always placed on the surface of the soil or buried 2" below the soil. This will create the best moisture levels in the soil for better plant development and is easier to extract at the end of the growing season. Care should be taken to ensure that the soil does not contain heavy metals that can be taken up by the hemp plants. These heavy metals end up in the foliage and will lower the value of the crop due to toxicity. Test your soil and ensure that you have a good clean, organic soil for your plants.

Product Spotlights to Complete Your Hemp Irrigation System



A Air Valves

Kinetic

- Discharges air during the system start up and introduces air during shutdown to prevent pipes and tubes from collapsing

Combination

- Provides air and vacuum release during system startup and shutdown, and continuous air release during system operation

B Filtration

F6400 – Semi-Auto Screen Filters

- Can handle silt, sand, scale and moderate amounts of organic contaminants

F3240 - Auto Flushing Filters

- Primary filter with suction scanner to keep the screen clean
- Automatic for labor saving

F1700 - Sand Media Filters

- Best for filtering water with large amounts of either organic or inorganic contaminants
- Available in epoxy coated carbon steel or stainless steel

C Drip Tape / Drip Line

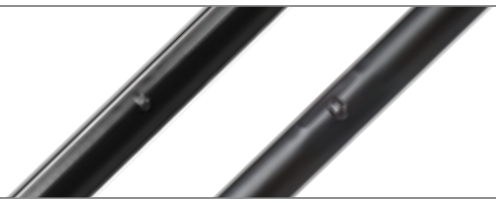
For flat topographies - T-Tape Drip Tape

- Features a unique chevron design flow path that creates a turbulent flow to provide excellent clogging resistance
- Numerous inlets built into the tape to prevent certain contaminants from entering the flow track.
- Recommended T-Tape configurations for hemp*: 508-12-220 or 508-12-340 (gpm/100 ft)

For Sloping/ Undulating Terrain - D5000 PC Drip Line

- Premium PC emitter delivers a constant flow over a wide-range of pressures to maximize uniformity on all terrains, including undulating and sloping topography
- Designed with 40 inlet filters across 3 zones to reduce the risk of foreign particles clogging the emitter
- Recommended D5000 PC configuration for hemp*: 5/8", 15 mil, 12" spacing, 0.17 flow rate (gph/emitter)

*Other drip tape/drip line products and configurations available.



D Manifolds

Manifolds deliver the water from the field control valves to the drip tape/line laterals

Pro-Flat Layflat

- Thick wall dimensions and a strong yarn structure help the product to hold connectors and resist bursting
- Robust construction reduces the amount of rotation and elongation each time the system is pressurized

H6000 PE Layflat

- Features the newest layflat technology with pre-installed outlets for durability and easy installation in field
- Strong durable weld between the outlets and the hose

E Connectors

Pro-Grip

- Tape fitting line that delivers both improved performance and ease-of-use thanks to large, deep ridges on the nuts that make them easier to tighten

F Control Valves

V2500 Plastic Hydraulic Control Valves

- Used to control flow and regulate pressure at the manifold to maximize uniformity
- Features wider passageways to minimize head loss for a more efficient system
- Designed with smaller control chambers for faster and more precise valve operation and increased control

Propagation and Irrigation in Greenhouse and Nursery Design with Hemp in Mind

For propagation of seeds, a light mist is perfect to avoid washing away the soil from the seeds. Fine seeds need gentle moisture application in order to keep the balance of moisture with air in the soil to avoid saturation and potential rotting of the seed. It is also important to not have water continue dripping out of the sprinklers/misters at shut down. These large drops can cause significant damage to the fine seeds below. A built-in check valve will allow frequent misting cycles by automatically closing the water feed to the mister at shutdown, enabling the water to stay in the LDPE tube between irrigation shifts.

Mister

Rondo Mist

- Ideal for irrigating during seed germination and cutting propagation
- Produces a droplet size of 150 micron
- Suitable for inverted installation

Climate Control

FLF: Fogger Low Flow

- Provides evaporative cooling and humidification in greenhouses
- Equipped with a vortex insert nozzle which offers a turbulent flow, minimizing clogging hazards.
- Available as a single fogger with an integral anti-leak device, or 2 or 4 foggers assembled on a cross compatible with the anti-leak device
- Easy to take apart for maintenance

Overhead Irrigation

Rondo Micro Sprinkler

- Inverted model is specifically for greenhouse irrigation. Once the crop has reached enough maturity, you transition from misting to the Rondo Micro Sprinkler where you can apply higher water volume
- Available in a range of flow rates and two different spinner options (flat and convex)