

Lowering Application Intensity

Low Pressure - High Performance

Peak Performance

... involves two primary sprinkler requirements:

1 Lowering Application Intensity

(a view on instantaneous area of coverage) Providing the largest area of **instantaneous** coverage possible, minimizes the impact on the soil surface and crop. This critical aspect of sprinkler performance is similar to the necessity for wide versus narrow tires on farm equipment to reduce soil compaction during field operations. The larger the area of soil surface that water is applied at **any given instant** of a sprinkler's operation, the lower the impact of the sprinkler pattern on the soil structure, preserving the soil's ability to absorb water. A larger area of **instantaneous** coverage also reduces the rate at which the soil is required to take in water. The preservation of intake rate and increased soak time greatly reduce the potential for irrigation water run-off and wheel rutting.



Illustration of i-Wob or Xi-Wob

Instantaneous application over a larger area lowers the impact of the sprinkler pattern on the soil structure.

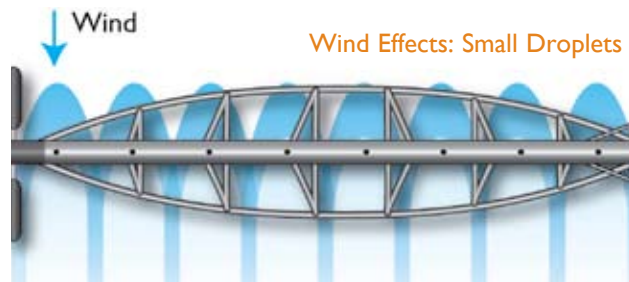


Illustration of Impact Sprinkler

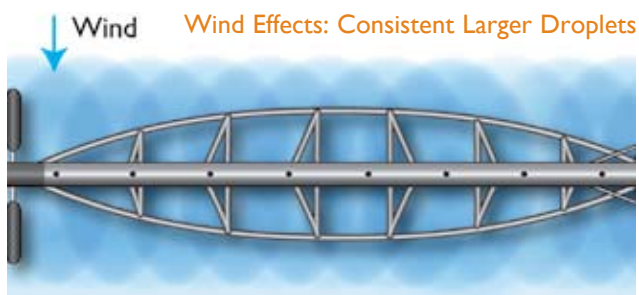
Instantaneous application into a small area can minimize soak time and result in run off and wheel tracking.

2 Sprinkler Pattern Integrity

Producing a sprinkler pattern that maintains its integrity in windy conditions and minimizes wind drift and evaporative loss is also required for peak performance. The key to meeting this objective is to produce a sprinkler distribution pattern that consists of relatively uniform sized droplets that are adequate in size to resist wind distortion. Droplets that are too small to maintain good pattern integrity can significantly reduce distribution uniformity. Wind drift and evaporative loss from small droplets lower irrigation efficiency and waste water and energy. The optimum droplet size is the largest droplet possible that does not have adverse effects on soil or crop.



Small droplets are easily affected by wind and their spray pattern can be distorted.



Larger droplets are less susceptible to wind. By spreading out these droplets to reduce intensity, a gentle application is maintained.

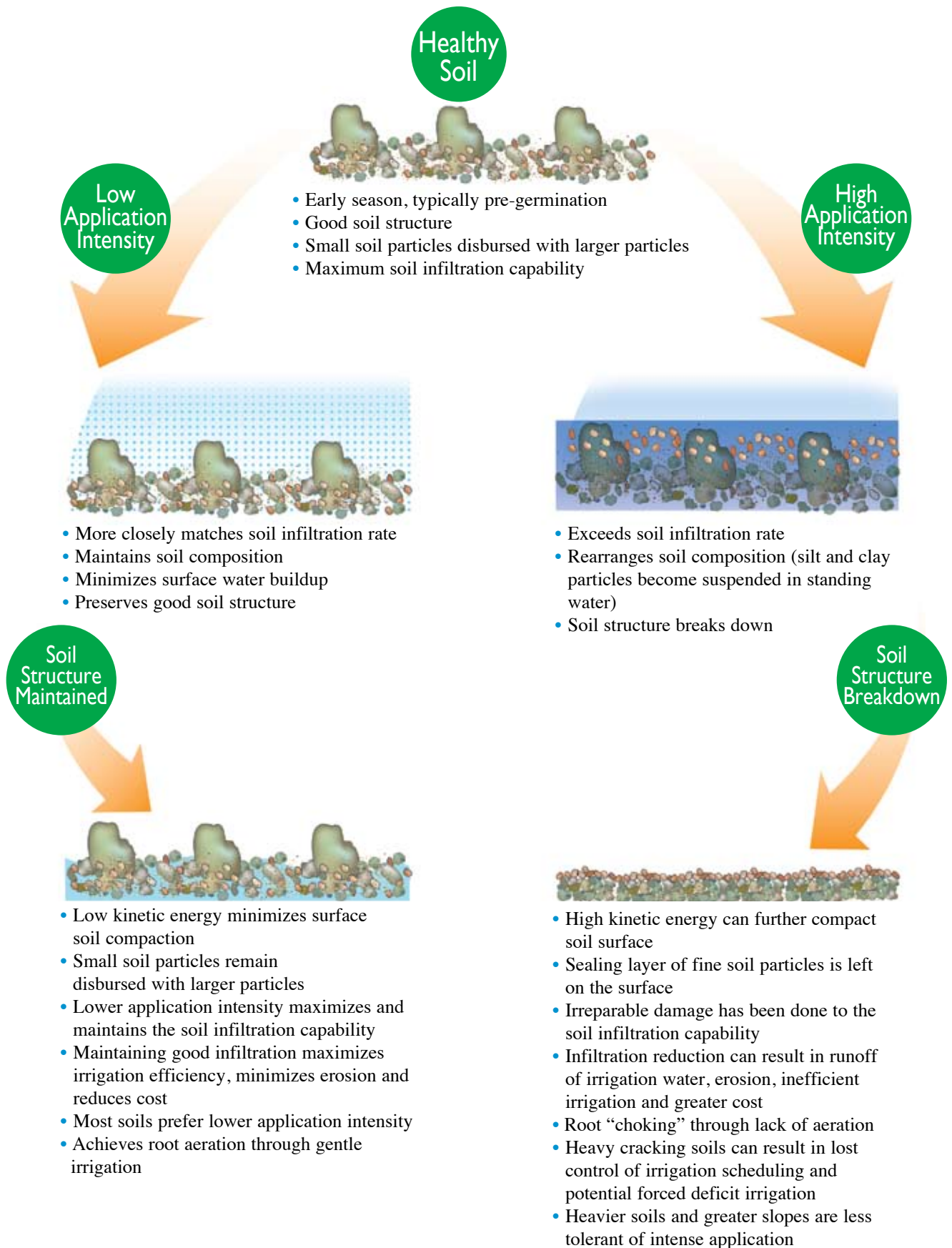


Ultra Low Pressure

Senninger Irrigation's line of center pivot products is designed for peak performance at ultra-low pressures of 10 to 15 psi [0.69 to 1.04 bar], and a recommended maximum pressure of 20 psi [1.38 bar]. Lower pressure translates to reduced horsepower requirements and reduced energy consumption. These low operating pressures offer many irrigators a tremendous opportunity to lower total pumping costs. Products specifically designed to provide **peak performance** in this low pressure range enable a center pivot irrigator to address all of today's challenges.

Benefits of Lowering Application Intensity

- Minimize runoff
- Improve uniformity
- Maintain infiltration capability





i-Wob®

For Flexible Hose Drop Installations

ULTRA Low Application Intensity

The i-Wob® provides the lowest instantaneous application rate of any pivot applicator on the market. The rotating wobbling action of the deflector allows the i-Wob to throw water much farther than other spray nozzles and sprinklers operating at 10 to 20 psi (0.69 to 1.38 bar). This same design also delivers a rain-like application of water to the soil that doesn't dissolve soil clods and seal over the soil like other ordinary products. The larger wetted area and uniform distribution allow the water to soak into the soil at a rate that can be absorbed and keep the soil structure fit for proper root development.



(left to right)

- **Low-Angle 6-Groove:** white deflector, largest droplets
- **Standard-Angle 9-Groove:** black deflector, medium droplets
- **Low-Angle 9-Groove:** blue deflector, smaller droplets

Sprinkler Pattern Integrity

The grooves in the deflector combined with the rotary action, deliver a consistent droplet size and outstanding uniformity. Consistent droplet size maintains pattern integrity, even in wind conditions, and helps prevent wind drift and evaporation. Droplet size can be tailored to the needs of the soil through selection of proper deflectors and operating pressures.

You can choose from two models of i-Wob weights, 3/4 and 1 pound, to help maintain applicator position and pattern integrity. Each is lower on the drop providing better stability and less stress on flexible drops, exposing less surface area to the wind than most conventional weights. The threaded weight attaches to the bottom of the i-Wob. The weight is designed to slip over the base and is used when the new dual nozzle carrier is used.

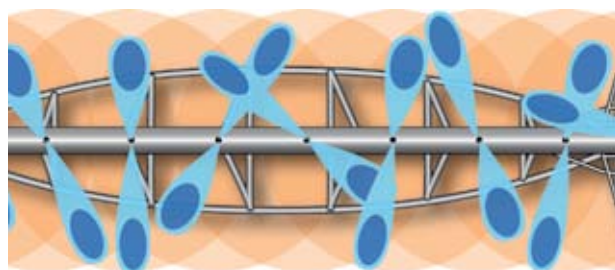


Overhead Views of Distribution

“Hot spots” in the application pattern of a sprinkler show areas of higher application intensity. Having a greater instantaneous area of coverage help eliminate “hot spots” and reduce soil structure degradation and runoff.

Stream-driven applicators can provide good throw distance but their distinct streams instantaneously place the entire flow in a relatively small area when compared to the i-Wob or Xi-Wob.

Stream-Drive Applicator: Overhead View





ULTRA Low Application Intensity

The Xi-Wob®, like the Senninger i-Wob, provides an ultra low instantaneous application rate. The Senninger Xi-Wob utilizes counter-balance technology which eliminates the need for flexible hose on the drop. It is ideal for PE or steel drop installations.

This counter balance technology, coupled with the wobbling rotary action of the deflector, allows the Xi-Wob to throw water much farther than other spray nozzles and sprinklers operating at 10 to 15 psi (0.69 to 1.04 bar). This same design delivers a gentle rain-like application of water to the soil that maintains the soil's infiltration capability, preserves good soil structure, minimizes surface water build-up.



(left to right)

- **615 Model:** 6 grooves, 15° trajectory, black deflector, largest droplets
- **610 Model:** 6 grooves, 10° trajectory, blue deflector, larger droplets
- **910 Model:** 9 grooves, 10° trajectory, grey deflector, medium droplets

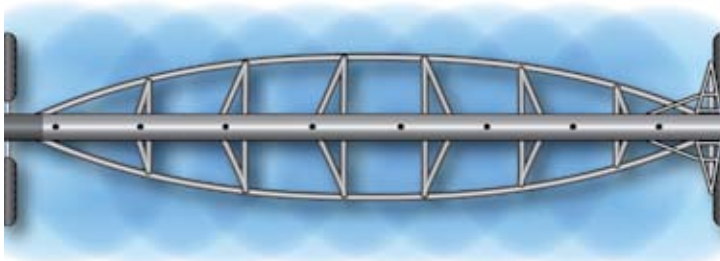
Sprinkler Pattern Integrity

The grooves in the deflector combined with the rotary action, deliver a consistent droplet size and outstanding uniformity. Consistent droplet size maintains pattern integrity, even in wind conditions, and helps prevent evaporation. Droplet size can be tailored to the needs of the soil through selection of proper deflectors and operating pressures.

The Xi-Wob produces a slightly smaller droplet size than the i-Wob. This is ideal for heavier soils.

The i-Wob and Xi-Wob offer immediate uniform coverage. This means they wet a much larger area with a much lower instantaneous application intensity — preserving soil structure and infiltration capability.

i-Wob and Xi-Wob: Overhead View



Low Pressure Performance

The i-Wob and Xi-Wob are extremely energy efficient. Little pressure is needed for outstanding performance.

Optimal pressures ranging from 10 and 15 psi (0.69 to 1.04 bar) offer big energy savings.



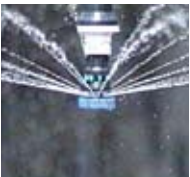
LDN[®] [Low-Drift Nozzle] Multiple Pad Spray Nozzle

Low to Moderate Application Intensity

By using multiple deflector pad levels (*single, double or triple*), the LDN[®] utilizes additional grooves to direct water and control droplet size. This enables it to handle large flows, up to 14.5 gpm (0.91 L/s) while still providing a gentle spread-out application.

As the nozzle flow increases with the distance from the pivot point, multiple pads are used to increase the area of instantaneous coverage. By dividing the nozzle flow into a larger number of streams and applying that flow over a larger surface area, the application intensity is reduced.

A triple pad configuration lowers application intensity by 20% to 25% compared to single pad nozzles at comparable flows.



Single Pad

0.5 to 5.25 gpm
(0.032 to 0.33 L/s)



Double Pad

4 to 9.5 gpm
(0.25 to 0.60 L/s)



Triple Pad

6.75 to 14.5 gpm
(5.10 to 0.91 L/s)



Single Pad

33 streams



Double Pad

66 streams



Triple Pad

99 streams

Sprinkler Pattern Integrity

The Senninger LDN has a unique multi-pad system that helps maintain uniform droplet size along an entire system. Consistent droplet size maintains pattern integrity, even in windy conditions and helps prevent evaporation.

LDN pads are available in concave, flat and convex with 24 or 33 grooves. They are used in different combinations to create the spray angle and droplet size best suited for specific soil and crop needs. Mini pads, chemigation pads, bubble pad and part-circle pads are also available.



LDN Double Pad

The LDN weight, because it is designed to slip over the LDN, is lower on the drop and exposes less surface area to the wind than most conventional weights. This placement means less weight is required to combat the effects of wind on the applicator, helping preserve pattern integrity. Available in 3/4 and 1 pound.



Low Pressure Performance

The LDN was specifically designed for low pressure operation, 10 to 20 psi (0.69 to 1.38 bar). Low pressure operation can mean big energy savings.

125° Goosenecks

Widen Wetted Area



Lower Application Intensity

The Senninger single and double 125° goosenecks combined with truss rod hose slings lower application intensity by increasing the area of coverage. Applying a given amount of water over a larger area (see diagram of water patterns below) can help allow the soil to absorb it at the rate it needs. This reduces soil compaction, soil sealing and runoff.

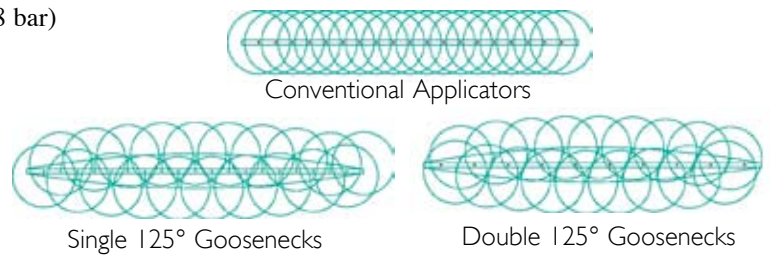
- Non-corrosive UV-resistant thermoplastic construction for long life and reduced plugging, costs less than standard steel models
- 3/4" barb and 3/4" NPT threaded outlet connections
- Maximum recommended pressure: 120 psi (8.28 bar)
- Maximum recommended flow:
Single models 20 gpm (1.26 L/s),
Double models 30 gpm (1.89 L/s)
- Maximum recommended water temperature: 110°F (43°C)
- Ambient temperatures up to 150°F (65°C) will not damage goosenecks

Sprinkler Pattern Integrity

The Senninger single and double 125° gooseneck and truss rod hose slings allow the drop hose and applicator to hang at a precise location along the truss rod without hindrance or kinking. This helps reduce pattern interruption from colliding streams.

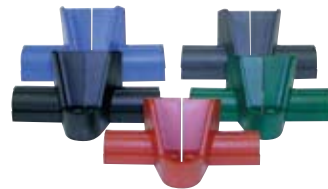
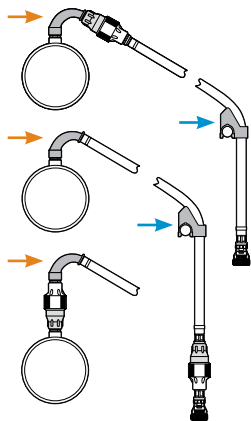
Goosenecks and drops place applicators closer to the crop which helps fight wind drift and maintain pattern integrity.

Diagram of Water Patterns



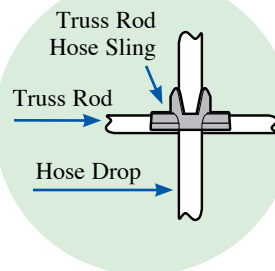
Single 125° Gooseneck

- Available with barb or NPT male outlets
- Single 180° Model also available



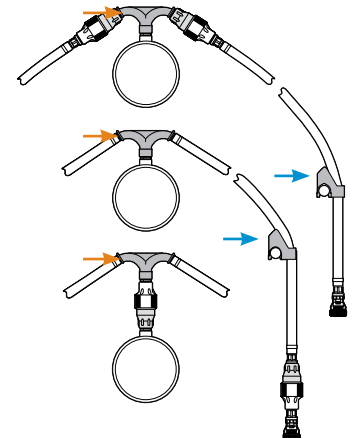
Truss Rod Hose Slings

Available for truss rods 5/8", 11/16", 3/4", 13/16" and 7/8"



Double 125° Gooseneck

- Available with barb or NPT male outlets



Goosenecks also available as assemblies with thermoplastic nipples for 3/4" NPT male connection



Pressure Regulators

Maintain Constant Preset Outlet Pressure

Application Intensity

Uncontrolled pressure fluctuations in irrigation systems result in unwanted flow deviations and over watering. Common causes of pressure variation include elevation changes, changes in system demand, and water supply. Proper use of pressure regulators prevents these fluctuations and help prevent over watering and help maintain overall efficiency of an irrigation system. Over watering increases application intensity and can result soil compaction, soil sealing, and runoff. Senninger pressure regulators maintain a constant preset outlet pressure even though inlet pressures may vary.

Sprinkler Pattern Integrity

Sprinklers and applicators are designed to operate within a range of pressures that provide optimal performance. Senninger pressure regulators maintain a

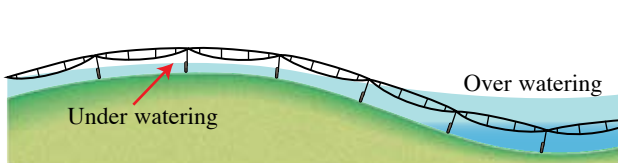


constant preset outlet pressure that can be matched to the applicator design, regardless of variations in inlet pressure. This helps maintain sprinkler pattern integrity and performance.



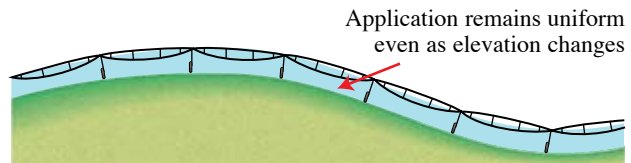
(left to right)

- **Pivot Special Regulator™ (PSR)**
Outlet pressure: 6 to 50 psi [0.41 to 3.45 bar]
Flow: 0.5 to 15 gpm [113.4 to 3402.0 L/hr]
- **Pressure-Master® Low Flow (PMR-LF)**
Outlet pressure: 6 to 40 psi [0.41 to 2.76 bar]
Flow: 0.1 to 8 gpm [22.7 to 1814.4 L/hr]
- **Pressure-Master® Medium Flow (PMR-MF)**
Outlet pressure: 6 to 60 psi [0.41 to 4.14 bar]
Flow: 2 to 20 gpm [453.6 to 4536.0 L/hr]



Without Pressure Regulators

Many irrigation systems have the potential to experience elevation and pressure changes causing flow fluctuations on unregulated systems.



With Pressure Regulators



16220 E. Highway 50 • Clermont, FL 34711 U.S.A.