

LEPA CLOSE SPACING

Save Water, Use Less Energy and Increase Yield

AGRICULTURAL IRRIGATION

Low Pressure - High Performance



WHAT IS CLOSE SPACING?

Senninger worked with Dr. Bill Lyle and Leon New at Texas A&M in the 1980's to develop the first LEPA (Low Energy Precision Application) applicator. Combining subsequent innovations developed by Senninger with growers' contributions, LEPA technology evolved into one of the most effective methods known today for mechanized irrigation systems.

Close Spacing is a water-efficient irrigation practice featuring low-pressure LEPA bubblers.

LEPA systems gently deliver water from a height of 8 to 18 inches above the ground to combat wind-drift and prevent evaporation loss. Researchers and growers have found that with LEPA heads, at least 20 percent* more water reaches the soil than with conventional spray nozzles.

Unlike traditional LEPA systems, where sprinklers are

placed 60 to 80 inches apart to irrigate every other furrow, the Close Spacing method distributes water over most of the soil surface with 40 inches or less between heads.

Conservation tillage practices further help prevent evaporation loss, and run-off by holding the water in the rows until the soil can absorb it. As a result, Close Spacing achieves application efficiencies typically exceeding 95 percent.

**Source: LEPA Conversion and Management by Dr. Guy Fipps and Leon New.*

Maximize effectiveness of water usage

- ① Prevent wind-drift losses
- ② Minimize evaporation loss
- ③ Avoid wetting plant canopy in row crops
- ④ Achieve a more uniform root zone coverage
- ⑤ Can increase yield using less water
- ⑥ Low pressure systems can reduce pumping costs
- ⑧ Ideal for both high and low profile crops
- ⑨ Apply water needed in fewer pivot passes
- ⑩ Qualifies for government funding in select areas
- ⑪ Reduce potential rodent damage to crop and equipment over drip systems



LDN LEPA OPTIONS



FOR OPTIMUM RESULTS, FIELDS WITH CLOSE SPACING SHOULD INCORPORATE:

- ① Tight spacing - 40 inches or less between applicators
- ② Sprinkler height - 8 to 18 inches above the ground
- ③ Conservation tillage - recommended to increase surface storage capacity and improve filtration
- ④ Level fields - ideal maximum slope is 1%
- ⑤ Filtering - smaller nozzles are prone to plugging
- ⑥ Soil moisture monitoring - recommended to help reduce deep percolation losses

LDN UP3 Bubbler Pad Assembly

The bubbler side of the deflector pad gently deposits water onto the soil surface in a bubbling stream. This aerated cascading stream resists the effects of wind and evaporation.

Easy Conversion to Spray Irrigation

For spray irrigation with either the LDN Bubbler Assembly or the LDN with the Shroud, simply twist and flip the deflector. Growers use this mode for germination. Deflectors are available with different trajectories - blue (concave) for a slightly upward spray, black (flat), green (convex) for a slightly downward spray, and white for a higher spray. They are available with different surfaces - grooved or smooth.

LDN with Shroud and Bubble Inserts

The Shroud is used in conjunction with deflector pads containing an insert. Growers can choose either the beige bubble pad insert or the red CM1 pad insert opposite a variety of deflectors based on their soil type and crop. The Shroud deflects the water from the bubbler insert down in a gentle dome-shaped pattern providing complete coverage of the field. Due to its less concentrated distribution pattern, the LDN Shroud can be used on fields without furrows and is often used for germination as well as irrigation.



RECOMMENDATIONS:

Flow: 0.27 to 18.35 gpm
(61 to 4168 L/hr)

Pressure: 6 to 15 psi
(0.41 to 1.03 bar)



Zinc Weight
ONEWGT4



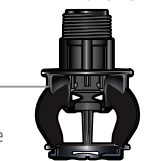
Magnum Weight
MAGWGTSLP



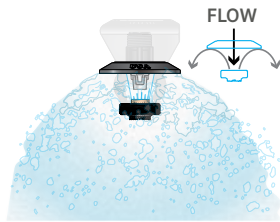
LDN Shroud
Bubble Spacer-UP3
(Used in place of weight)
LDNSBS-UP3



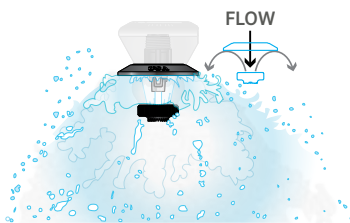
UP3 Nozzle
UP3NZ_



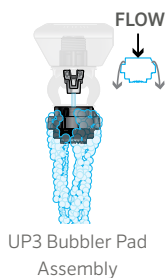
LDN-UP3 Bracket
LDNBRASM-UP3



LDN with Shroud and
beige bubble insert



LDN with Shroud and
red CM1 insert



UP3 Bubbler Pad
Assembly

LDN Bubble Pad Inserts
Shroud required

	Concave Pads (CC) (Blue)	Convex Pads (CV) (Green)	Flat Pads (FL) (Black)	Germination Pads (White)
Bubble mode				
	Shown: CC 24-Groove/ Bubble (Beige) Other option: CC 33-Groove/ Bubble (Beige)	Shown: CV 24-Groove/ Bubble (Beige) Other option: CV 33-Groove/ Bubble (Beige)	Shown: FL 24-Groove/ Bubble (Beige) Other option: FL 33-Groove/ Bubble (Beige)	Shown: CT/Bubble (Beige)
Spray mode				
	Shown: CC 33-Groove/ CM1 (Red) Other option: CC 24-Groove/ CM1 (Red)	Shown: CV 33-Groove/ CM1 (Red) Other option: CV 24-Groove/ CM1 (Red)	Shown: FL 33-Groove/ CM1 (Red) Other option: FL 24-Groove/ CM1 (Red)	Shown: CT/CM1 (Red)

LDN UP3 Bubbler Pad Assemblies
Shroud not required

Shown: CC 33-Groove/ Bubbler Other options: CC 24-Groove/ Bubbler CC Smooth/ Bubbler	Shown: CV 33-Groove/ Bubbler Other options: CV 24-Groove/ Bubbler CV Smooth/ Bubbler	Shown: FL 33-Groove/ Bubbler Other options: FL 24-Groove/ Bubbler FL Smooth/ Bubbler	Shown: CT/Bubbler

Other spray pad surfaces available. Consult factory.
Small 12-grooved pads available (Used with UP3 Nozzles #2, #2.5, #3, #3.5).
120-Mesh Filtration Recommended.



*low*pressure*components*

PRESSURE REGULATORS

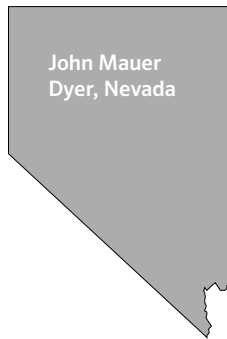
Pressure regulators enable applicators to operate properly. With low pressure systems, any fluctuations can significantly impact system performance. Higher pressures can create small droplets susceptible to wind-drift, misting and evaporation. Pressure regulators can be installed at the top of the drop or directly above the applicator. A Senninger Pressure Drop can be installed at the end of the pivot just above the bubbler head to monitor system design pressure.

GOOSENECKS

Senninger 180 and 125-degree goosenecks are constructed of non-corrosive, UV-resistant thermoplastic materials for long life and reduced plugging. 125-degree single or double models are used with Truss Rod Hose Slings. Goosenecks offer installation options for either NPT or hose barb outlets. Truss Rod Hose Slings securely fasten a $\frac{3}{4}$ " flexible hose to the truss rod to maintain drop/sprinkler position. Supporting the flexible hose of the drop prevents kinking and abrasive wear. Color-coded models are available for various truss rod sizes: $\frac{5}{8}$ " (rust), $\frac{1}{16}$ " (green), $\frac{3}{4}$ " (black), $\frac{13}{16}$ " (grey), and $\frac{7}{8}$ " (blue).

SMALL UP3 NOZZLES AND PADS

Small nozzles and deflector pads are designed as an option for the first spans of a machine where overwatering is an issue. These nozzles and pads are ideal for low pressures up to 15 psi (1.03 bar) and lower flows between 0.07 to 0.33 gpm (15.9 to 75 l/hr). Due to the small orifice size of these nozzles, filtration of 120-mesh will be needed to help reduce plugging.



- Location: Nevada
- Size: 4000+ acres
- Soil: heavy silt clay loam
- Elevation change: 0-17 feet (varies by field)
- Planting: standard, flat to slight slope
- Tillage: conventional tillage
- Crops: alfalfa, grain

INCREASED YIELDS

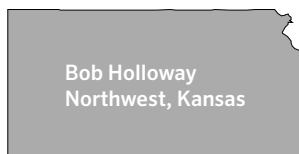
John Maurer, manager of Triple D Ranch in Dyer Nevada, converted several center pivots from sprinklers to Close-Spaced LEPA applicators and realized increased yields with the same amount of water. John is a strong advocate for this installation, to date he has converted 41 of 50 machines and will continue until all 50 have been converted.. He has also seen improved salt leaching and even significant reduction in pocket gopher activity. He continues product testing to qualify those results under varying conditions. With this testing he is hoping to see if reducing the water will produce the same results.



- Location: Texas panhandle
- Size: 8500 acres
- Soil: silty clay loam
- Elevation change: 100 ft (varies by field)
- Planting: 30" rows
- Tillage: ridge till
- Crops: corn

REDUCED WIND DRIFT AND EVAPORATIVE LOSS

Harold Grall, owner of Hasta Farms in the Texas panhandle, is relentless in his efforts to reduce evaporation loss and be as efficient as possible in the application of water. Several years ago, he installed Close-Spaced LEPA using LDNs with the UP3 bubbler pads on some of his pivots. Since the Texas drought, he has converted more and more pivots to the LDN with the Shroud and bubbler insert. The low-to-ground delivery reduces wind drift and evaporative loss and their close spacing uniformly soaks the soil for good root development. He is amazed with what he can do for less.



- Location: northwest Kansas
- Size: 244 irrigated acres
- Soil: silt loam
- Elevation change: 0.5-5% (varies by field)
- Planting: row
- Tillage: strip till
- Crops: corn, wheat, soybeans

FARM MORE ACRES WITH THE SAME WATER

Bob Holloway, a grower in northwest Kansas, at the recommendation of his dealer, converted from sprinkler irrigation to Close-Spaced LEPA applicators. He believes this change allowed him to farm 50% more corn (120 acres) with 250-300 gpm. Recognizing there are several factors impacting season end yield results, Bob feels Close-Spaced LEPA applicators contribute to the success he is seeing. Even with recent commodity prices, he saw a payback of 2-3 years. He feels the investment not only saves money but can help make money, especially in dry hot years.



We strive to create the best low pressure, high performance agricultural irrigation products in the world while maintaining the highest level of quality and reliability. In every instance we will back our innovations with the unwavering support our customers need to succeed.

A handwritten signature in white ink that reads "James E. Burks". The signature is fluid and cursive, with the first letters of each word being capitalized and prominent.

James E. Burks, President of Senninger Irrigation