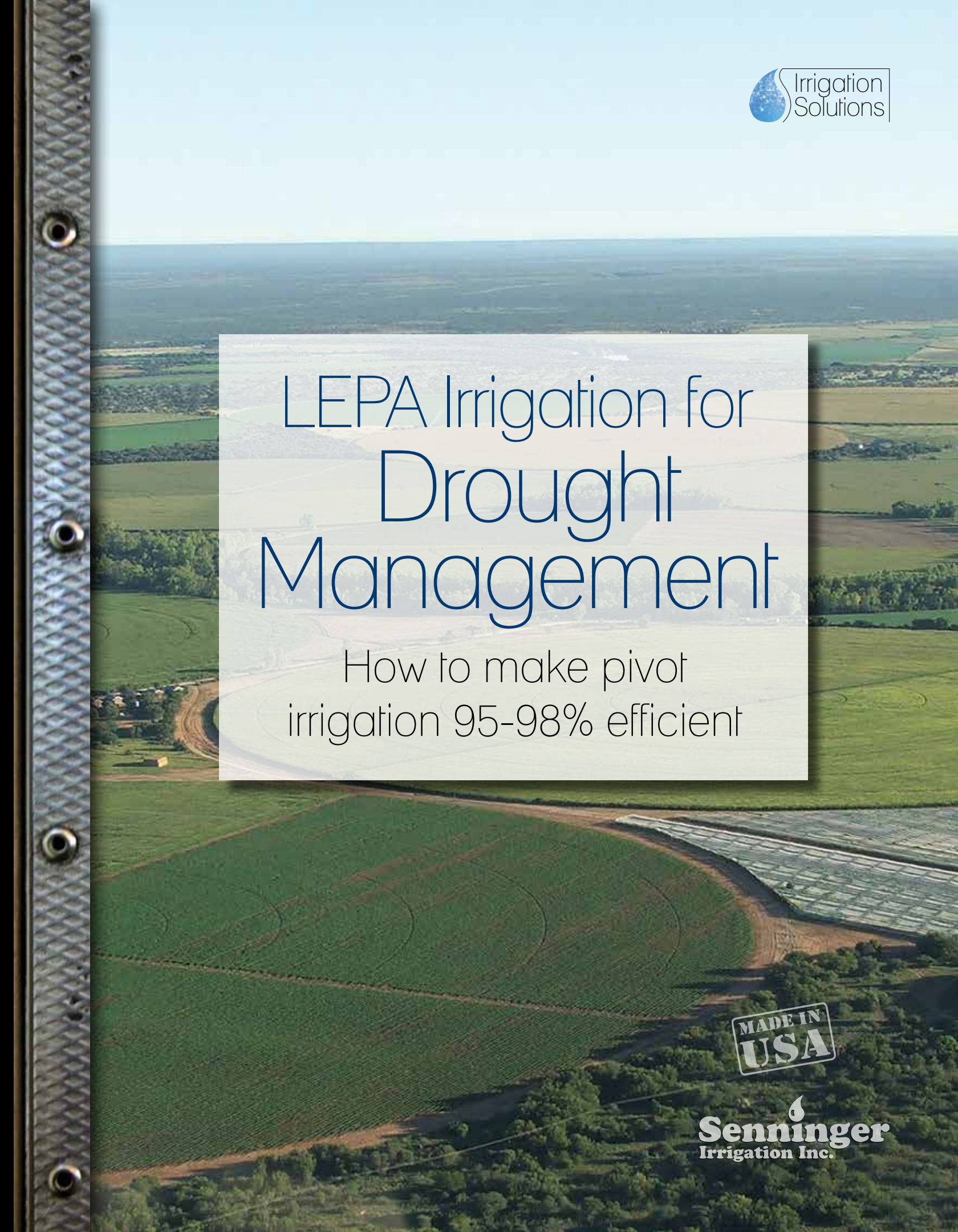

Irrigation Solutions
LEPA Irrigation for
Drought Management
How to make pivot irrigation 95-98% efficient
MADE IN USA
Senninger
Irrigation Inc.

Center Pivot

Historically, farmers along the west coast have never considered center pivots efficient irrigation systems. Drip systems have always been a popular option in the region due to their low flow rates and high application efficiency.

Center pivot technology has come a long way in recent years with improvements to irrigation efficiency and data tracking. Pivot manufacturers have a better understanding of soil health and the water needs of various crops. These improvements, coupled with drastically lower labor costs, position center pivots as a viable solution for farmers with limited water availability.

Pivot Irrigation Efficiency

A well-managed center pivot can be as water and energy efficient as a drip system.

Most pivot irrigators have abandoned the inefficient impact sprinklers familiar to most fruit and vegetable growers. Instead, farmers in water scarce regions have adopted Low Energy Precision Application (LEPA) sprinklers. These sprinklers deposit water about one foot above the ground with less than 5 GPM per head. They prevent evaporation and wind-drift issues and increase a pivot system's overall efficiency.

Farmers can also verify a system's efficiency and make any necessary adjustments to their pivots easily.

With new monitoring technologies, farmers have the ability to monitor almost every aspect of the system, from how much water needs to be applied and to when water is delivered. Many monitoring tools also alert farmers to potential problems in the field or with their equipment.

Pivot and sprinkler manufactures have also evolved along with the products themselves. Manufacturers are taking a closer look at soil and developing pivot components designed to preserve soil integrity.

New sprinklers are designed to irrigate with low kinetic energy, minimizing surface soil compaction. Sprinkler packages can also be designed to distribute water at a rate that matches soil's infiltration rates.

Pivot sprinklers are also effective for germination and salt leaching, so farmers can feel secure planting higher quality crops such as lettuce, beans, onions and garlic and rotating crops each season.

Myth Busting

Myth #1
Pivots can't irrigate corners without water wasting end guns.

Farmers who want to use center pivot irrigation but want to continue farming the corners of their fields can add swing arms that attach to the ends of the pivots and water the corners of the fields.

Myth #2
Pivot sprinklers waste water through runoff and surface soil evaporation.

There are sprinklers that gently distribute droplets large enough to resist wind. They uniformly spread droplets over a large area, helping preserve the soil's intake rate and ability to absorb water.

Myth #3
Pivots can't be used with crops prone to foliar disease, like tomatoes.

Pivot sprinklers are extremely flexible! A spray head like the Senninger LDN can be used in spray mode to germinate fields as a growing season begins. Then it can be switched to LEPA bubble mode, which avoids wetting crop leaves. The sprinkler can also be converted to a drag hose if necessary.

Myth #4
Pivots can only irrigate a limited number of crops like corn or cotton.

Did you know pivots are used to irrigate rice, tomatoes and sugar cane? It's easy to modify pivots to irrigate different types of crops – most of the changes have to do with sprinkler height and application rate – and they are easy to move out of the way when it is time for planting or harvesting.

Myth #5
Pivots are way more expensive than other systems.

The price of a pivot may seem overwhelming at first, but investing in a pivot means you invest in an irrigation system that can last up to 25 years. Pivots are very easy to maintain. Most of what you pay is for the system itself – you won't have to worry about filtration, checking the system for rodent damage, system flushing, air discharging, etc.

Myth #6
Pivot technology is always changing so there's no point in buying something that will soon be outdated.

The main components of a pivot will last for decades. Add-ons like GPS control, automated system control and Variable Rate Irrigation Technology can be installed long after the pivot is purchased. Sprinklers and pressure regulators can be easily replaced when they wear out or if new technology becomes available.

Myth #7
Sprinklers use too much water and energy.

Sprinklers use anywhere from 0.27 to 21.18, gallons of water per minute. They only need 6 to 20 psi to operate, depending on the model selected.

Low Energy Precision Application

What is LEPA?

Low Energy Precision Application (LEPA) is one of the most efficient irrigation methods available today. The technology was originally developed in the 1980s for center pivot irrigation in areas with high energy costs and declining water availability due to dropping water tables or dwindling surface supplies.

LEPA offers growers both extremely high water application efficiency and low, energy saving operating pressures through a combination of unique sprinkler heads that avoid wetting the crop canopy and conservation tillage practices that preserve soil moisture and reduce runoff.

What does a LEPA system look like?

True LEPA systems use low-pressure bubble heads to deposit water directly into furrows just 8 to 18 inches above the ground. With the heads closer to the crop, the water avoids the hitting leaves. Water does not come in contact with plants and fruit susceptible to water borne diseases and nearly all of it is absorbed by the soil.
LEPA is primarily used on relatively flat fields. The maximum recommended slope is 1%. It also requires circular planting to keep the sprinkler centered in the furrow. Circular rows help increase uniform water disbursement and reduce runoff.

According to researchers at Texas A&M, at least 20% more water will reach the soil surface compared to conventional spray heads, which are very susceptible to high wind speed, low relative humidity, temperature, and evaporation losses. For a growers with a center pivot operating at 800 GPM, this means they can get an extra 140 to 180 GPM to the ground and the crop.

How do LEPA sprinklers irrigate?

Bubble heads use less energy than conventional low-pressure sprinklers and can operate using fewer gallons per minute – approximately 0.27 to 21.18 gpm. The flow from each head can be easily changed during the season with no change in application efficiency.

There are two types of bubble heads available:

- One deposits water straight down into furrows and distributes water in a narrow stream that avoids wetting the foliage. This aerated stream provides a cascade of bubbling water instead of a fine mist, so growers don't have to worry about evaporation due to high temperatures and low humidity or strong winds blowing away droplets.

- The other deflects water down in a wide, dome-shaped pattern that gently distributes water without spraying. This type of bubble can be used on fields without furrows and on rolling terrains due to its less concentrated distribution pattern.

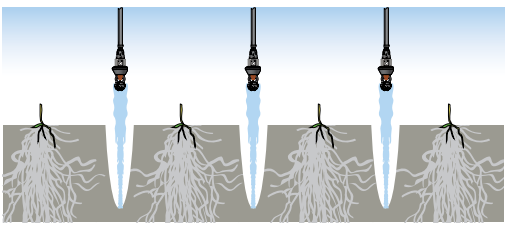
Close Spacing LEPA Bubblers

What is Close Spacing?

Close spacing is a water-efficient irrigation practice that combines sprinkler heads made for LEPA irrigation with strip-till or no-till. It involves doubling the drops on a pivot from traditional 60-inch spacing to tighter 30-inch spacing between heads.

Growers in arid, drought stricken regions developed the practice as an improvement on already established LEPA methods.

So what makes Close Spacing Different?



At a glance, close spacing and traditional LEPA irrigation seem virtually the same. Both methods require nearly identical management practices and provide similar benefits.

In traditional LEPA systems, applicators are mounted far apart so they can irrigate every other furrow. Less than half of the soil surface is wetted to reduce evaporation losses as much as possible. Now, growers are using close-spacing methods and placing an applicator on every row to wet the entire soil surface. With the help of the residue left behind, they can fully fill the soil profile during pre-watering and achieve more uniform root zone coverage without worrying about surface soil evaporation.

The residue left over from previous growing seasons suddenly becomes more than just a buffer to prevent runoff and erosion. It protects the water applied by keeping the soil cool and keeping the water in place until the soil is ready to soak it. Previous root channels left untilled also help water channel down below the soil surface. Conventional tillage dries out the soil, but strip-till and no-till farmers retain approximately 2 to 4 inches of increased soil moisture depending on the season.

Sprinklers and Pressure Regulators

LDN Bubbler

The LDN Bubbler pad distributes water in a narrow stream that avoids wetting the foliage. This minimizes evaporation and wind-drift losses.

- Deposits water straight down to the soil
- Flow Range: 0.27 to 21.18 gpm
- Pressure Range: 6 to 20 psi
- Aerated bubble does not atomize water
- Easily converts back to spray irrigation with just a flip of the deflector pad

LDN Shroud

The LDN Shroud deflects water down in a wide, dome-shaped pattern that gently distributes the water without spraying.

- Ideal for germination and low crop watering
- Flow Range: 0.27 to 21.18 gpm
- Pressure Range: 6 to 20 psi
- Applies water directly to the soil and/or plant
- Easily converts back to spray irrigation with just a flip of the deflector pad

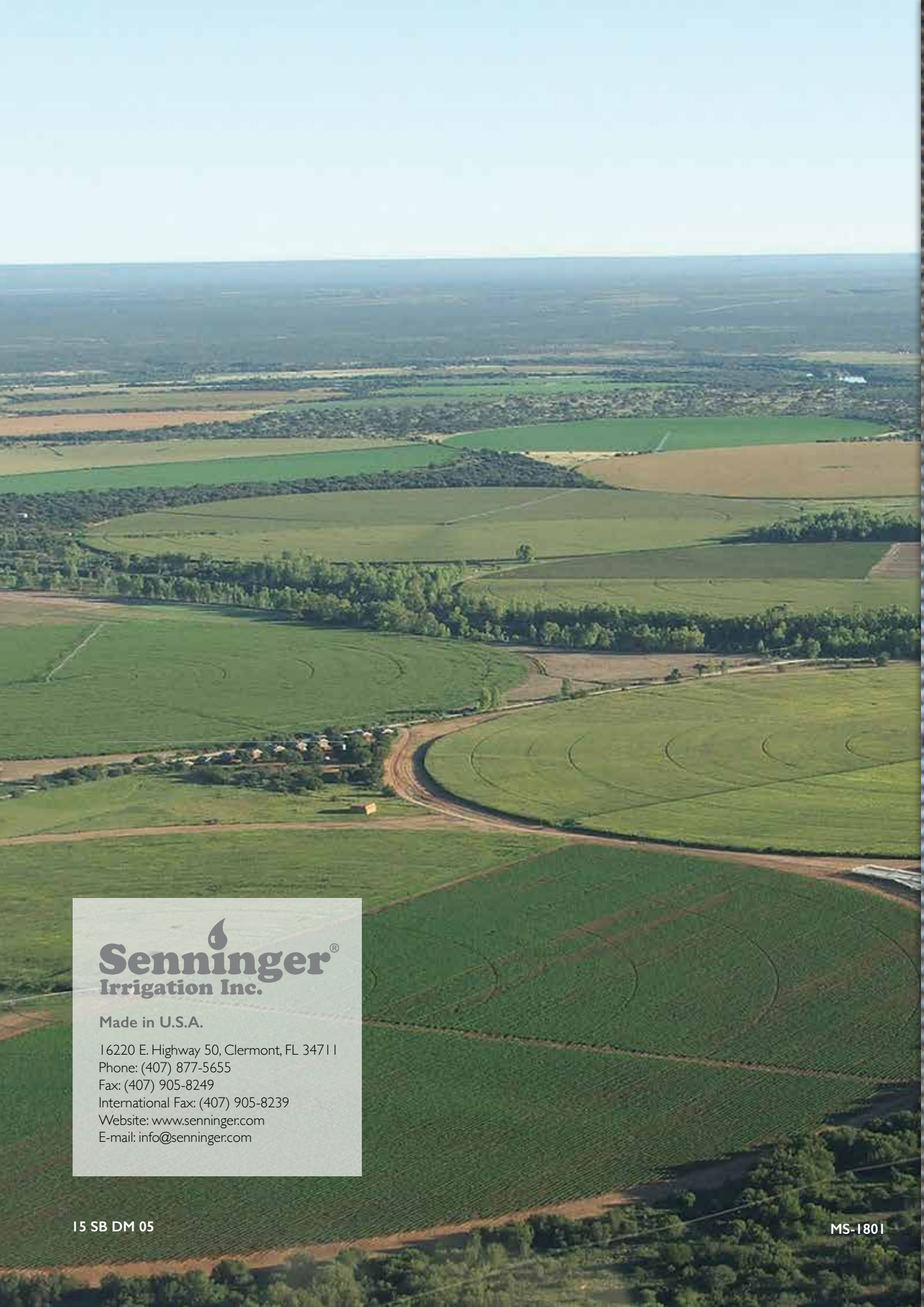
Pressure Regulators

It's critical to accurately monitor and control pressure fluctuations on any irrigation system – and more so on low pressure systems. Senninger pressure regulators maintain a constant preset outlet pressure that can be matched to the applicator design, regardless of variations in inlet pressure.

Uncontrolled pressure fluctuations in irrigation systems result in unwanted flow deviations and over or under watering. Proper use of pressure regulators prevents these fluctuations due to elevation changes, fluctuations in system demand, and water supply, and helps maintain the overall efficiency of an irrigation system.

Benefits of Pressure Regulators

• Greater application uniformity • Optimum system performance • Longer system and component life • Energy savings due to lower pressure operation • Conservation of natural resources



Senninger®
Irrigation Inc.

Made in U.S.A.

16220 E. Highway 50, Clermont, FL 34711
Phone: (407) 877-5655
Fax: (407) 905-8249
International Fax: (407) 905-8239
Website: www.senninger.com
E-mail: info@senninger.com

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