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CENTER PIVOT SPRINKLERS *Uniformity, Calibration and Upgrades*

Sprinkler Uniformity | What is it? Sprinkler uniformity on a center pivot system is about having a system that is delivering the same amount of water from one end to the other. Basically, it's checking the length of the system to determine if the amount is equal and if it is not, then identifying areas which need correction or adjustment.

This starts with a cup test. This requires cups being placed at 10' spacings in a line the length of the system. These cups can be basic drinking cups placed in holders approximately 3 to 4" above the ground. The first span can be left out as the amount of water applied here can deviate greatly due to nozzle size limitation and the fact that the amount of ground covered is small.

Once the cups are set, the system can be run across them making sure the pressure matches the specs for that system. Do this when the wind is low for more accurate results, preferably in the morning or early evening to eliminate possible evaporation. Set the speed for .6". After the system has been run, collect the samples, and record the exact location on the pivot and the amount of water collected in the cup using a reasonably accurate measuring container. When this data is gathered it can be entered into an Excel spreadsheet (available by Google, search MSU irrigation uniformity spreadsheet). After entering the data into the spreadsheet, a performance chart can be printed that will assist in finding any issues with the sprinkler package.

Nozzle Calibration | Coefficient numbers of 85% or better are considered good and not needing evaluation. Anything less should be examined for possible issues. Those issues could be:

- a. Sprinklers not operating correctly
- b. Plugged or restricted nozzles
- c. Worn nozzles
- d. Improperly placed sprinklers
- e. Worn or restricted regulators

A sprinkler chart for that system is helpful in determining sprinkler placement and correct nozzle sizing for that system. Typically, this is found in the panel, but your dealer can get one for you if needed.

Sprinkler Upgrades | When looking at sprinkler uniformity and seeing any issues, especially with older systems, this is the time to look at upgrading to a more efficient package. Things to consider when doing this:

Know your well capacity - gpm and pressure at the well discharge. If you don't, get it checked. Most well drillers and reputable irrigation dealers can accurately flow test your well. Some wells can flow more water at lower pressure, but you will need to know pump curve, pumping levels and sustainability of higher flow rates. Also, a higher flow rate may require a water use registration change. Again, consult with your well driller before doing this. *(Continued on page 2)*

CENTER PIVOT SPRINKLERS *(continued)*

Understand crop needs. Different crops have different water requirements. For instance, a low hanging drop package may work good on potatoes and beans but will not work well in 8' corn. Hay and grass can tolerate lower angle sprinklers and higher application rates due to ground cover.

Understand application rates. Application rate considers the wetted area and the volume of water applied. Instantaneous application rate is how much water is hitting an area at that moment.

Know your soil types and slope. Sand has high infiltration rates. Loam has medium infiltration rates. Clay has low infiltration rates. Consider slope too. Flat ground can tolerate higher infiltration rates. Slope ground can create runoff conditions based on soil type and sprinkler type. Wider spread packages are preferably here to avoid runoff conditions especially in higher flowrate systems.

Sprinkler Types

Impact sprinkler - Has a high instantaneous rate and high energy use, typically 40-80 psi. These are rotating devices that apply water in one area as it rotates around. Old technology but still very prevalent in the industry. Very high wind drift potential and heavy droplets. Typically, wider spacings, larger nozzles and less prone to plugging issues.



Fixed spray - Not normally seen in our area. These devices use a fixed stream plate that applies water heavy to the outer portion of the circle pattern. High instantaneous rate, 6-30 psi. Low wind drift potential due to heavy droplets. Could cause sealing on certain soils and runoff on sloping ground.

Rotating stream devices (Rotators) - One of the first center pivot specific sprinkler options to operate at lower pressures, typically 15-30 psi. These devices use a rotating plate with streams that apply water in a circular pattern that tends to be heavy at the other portion of the circle. High instantaneous rate. Low to medium wind drift depending on mounting. Can be up top or on a drop.



Distribution sprinkler - This is an off-axis type sprinkler or what most know as a "Wobbler." It uses a multi stream plate that rotates around an off-axis point that causes the streams to break into droplets that replicate rain fall. These devices have the lowest instantaneous application rate and very low energy use, operating at 6-20 psi. They can be mounted up top or on a drop. The plates have different trajectory patterns which can be chosen to match soil and slope conditions. These sprinklers have a vibration inherent in their design that require them to be mounted with some hose for isolation or on a specific mount when used up top. Certain brands are capable of mounting on solid poly drops.



VFDs and Pressure Regulators

A few other things to consider. VFDs (variable frequency drives) have become very popular in the irrigation business. A VFD is an electrical panel that can vary the hertz of the electrical current and allow an electric motor to operate at varying speeds. They allow the well to operate at optimum pressure that the center pivot is designed for. End guns turning on and off and corner systems with valves and sprinkler banks turning on and off create fluctuating pressure on the system. The VFD when programmed correctly can adjust for this to save water and energy that would be wasted when using traditional starter panels that operate well motors at one speed. They also allow the system to apply water more efficiently and at the correct volume.

Another is pressure regulators. Most all low-pressure devices require pressure regulators to keep them operating correctly. Without them, the sprinkler will apply more water when the pressure increases, say the end gun shutting off or corner system extending. Also, they keep the sprinkler from misting and creating wind drift conditions. Regulators also will keep the device performing correctly in sloping fields where system pressure can vary depending on where spans are in elevation in relationship to the pivot center or water supply. All sprinkler manufacturers will recommend replacing regulators after 10 years to maintain proper performance. There is no easy way to check whether they are performing correctly short of pressure changes in the system or if you see them leaking out the side.

CLASSIFIEDS



\$19,990

RAINBOW MFG CO GEN SET (NEW)

- 15KW Lima MAC Generator
- Yanmar 4TNV84T-BGGES-SSB Diesel Engine
- 535A Battery Kit
- Fusible Disconnect - 15KW
- Galvanized Hood



\$7,437

CAPRARI PUMP (NEW)

- Caprari D3/65 PTO pump with cart
- 4" check valve
- 4" NPT suction and discharge
- 500 GPM @ 130 PSI



\$1,500

NACD SAE MOUNT PTO CLUTCH (USED)

- SAE 3# bellhousing
- 140 hp rated
- Includes ring gear & PTO shaft
- Low hours



FOR PRICING INFO, CALL (989) 287-3633

2007 INTERNATIONAL BOOM TRUCK (USED)

- Crane rating: 82,100 ft lbs
- Max capacity: 14, 400 lbs
- Max reach 26 ft.1 in.
- 10 speed manual trans
- 136,500 miles
- Will separate boom if needed



\$1,350

SQUARE D 25 HP STARTER PANEL (USED)

- 8940SSD4025
- 25 HP power rating
- Disconnect rating: 60A
- Enclosure: NEMA 3R



\$11,800

KIFCO B140G 1.4" X 350' (USED)

- Water reel w/SR75 gun, 24° x 1.5
- Booster pump 5.5HP with mounting kit
- 2 available



\$3,000

PORTABLE PRIMARY PUMPING UNIT ON TRAILER (USED)

- Honda 5.5 HP gas engine
- Monarch high PSI pump
- 5# primer
- 0-100 GPM @ 35-70 PSI



\$15,117

KIFCO B140G 1.4" X 350' (NEW)

- Irrigated acres per run: 0.9-2.0
- Water reel w/SR75 gun, 24 deg x 1.5
- Booster pump 5.5 hp w/ mtg kit
- Kit, pneumatic tire/wheel upgrade



\$425

KOMET TWIN 101 GUN (USED)



\$450 EACH

RHINOGATOR TIRES (NEW)

- 11.2 X 38 tire size
- Tire and rim come



\$350 EACH

NELSON END GUN (USED)

- Nelson F75 21 deg
- 3 available



\$1,250

GE ELECTRIC MOTOR (USED)

- 40 HP Holloshaft electric

EMPLOYEE SPOTLIGHT



Kade Ellens **Build Crew Member**

Farm Services Inc. would like to introduce you to Kade Ellens, a member of our build crew. Kade joined the FSI team in May.

Kade studied welding at the career tech center his last 2 years of high school before graduating in 2015 from Northern Michigan Christian School. He worked for an equipment company before coming to FSI.

In his spare time, Kade likes to hunt, ride dirt bikes and spend time with his wife Samantha and children Ellie and Adelyn.

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