Fertilizer Application

N-Ject LF®

Patented
Additional Patents Pending

CAPSTAN Ag Systems, Inc. Since 1893

Liquid Fertilizer Issues

- Fertilizer input costs jumped last year!! OUCH! Will it go higher?
- Need to look at options to better manage fertilizer inputs costs
  - Better placement across field
  - Improve row-to-row accuracy across the toolbar/planter
  - Avoid overlap waste
  - Rate compensation along boom in turns
- Check with Crop Advisor on spring application recommendations
  - Varying rates by management zone maps?? $$Savings?
  - Base rate, VR side-dress,
- Change orifice sizes quickly for different rates.

I sure could use a SILVER BULLET!

Definition:

Silver Bullet

a. A straightforward solution perceived to have extreme effectiveness.
b. The phrase appears with an expectation that some new technology or practice will easily cure a major prevailing problem.
c. Used by the Lone Ranger.

...might his silver bullet be N-Ject LF!

The secret is the distribution and orificing!

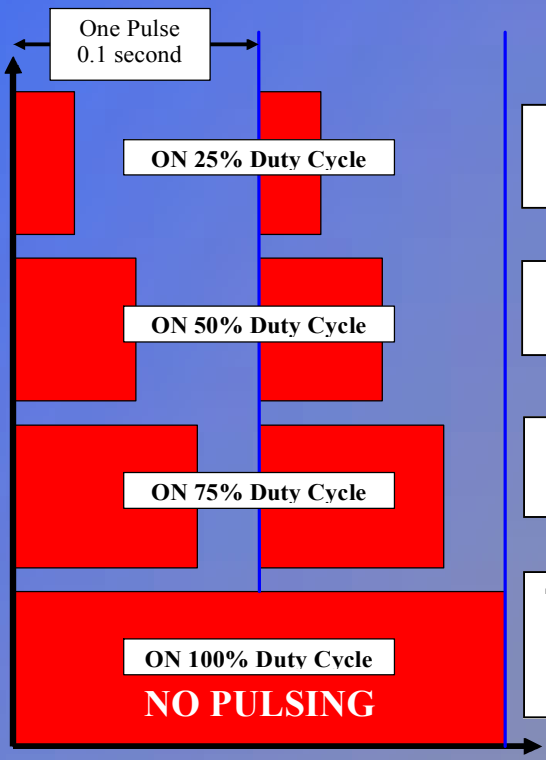
- **N-Ject LF** configures a simple **distribution manifold** coupled with "**on-the-go" variable orifice** technology to uniquely solve the "Liquid Fertilizer Issues" listed on the front.
- The manifold and orifice technology inherently provides for row-to-row accuracy on all types of field terrain.
- With **N-Ject LF computer-based technology** orifice sizes can now be **automatically** and **instantaneously** changed "on-the-go" to provide a wide range of application rates often prescribed by variable rate application maps.

How does N-Ject LF change orifices "on-the-go"?


PWM Solenoid Orifice

- A **standard orifice,** typically located at the coulter or knife opening, is removed. The supply hose is connected directly to the knife or coulter opening equipped with a 1/4"stream straightener.
- The standard orifice is replaced by **PWM solenoid orifice** mounted at the outlet of the product manifold. (PWM = Pulse Width Modulation).
- **Computer technology** is used to control the solenoid duty cycle (open time) to simulate a variable orifice that can change instantaneously to maintain desired application rates.

For example: Using an 1/4" stream straightener with the solenoid orifice



Now it passes 1/4th the rate

Now it passes half the rate

Now it passes 3/4th the rate

The solenoid orifice passes the maximum rate

At the **top speed and GPA rate,** the solenoid valve is on a 100% Duty Cycle and the solenoid orifice flows fertilizer with no pulsing.

(See the bottom of the red graph)

For a **lower rate,** the N-Ject LF computer intercepts that rate controller signal to "decrease the gpm rate". The signal is converted to a Duty Cycle in the solenoid valve to simulate a smaller orifice. Net result: Instantaneous change in a GPA rate.

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