



CHECK PLANTER'S LIQUID STARTER EQUIPMENT BEFORE HEADING TO THE FIELD

As planting season nears, there are some things to check on the planter's liquid fertilizer system to be sure that PureGrade® Low-Salt Starters will be properly applied. For most growers there will be little to do except to check for wear and tear and cleanliness.

The problems we see in the field fall into one of these three general categories:

1. **Improper setup or maintenance**
2. **Incorrect rate or different rates from one row to the next**
3. **Broken or missing parts**

EQUIPMENT SETUP

Fertilizer manifolds used on planters and drills to distribute fertilizer to each row fall into two distinct categories; those that use orifices (pressurized systems) to control flow to each row and those that don't.

Manifolds with orifices are highly recommended to accurately deliver PureGrade liquid starter to each and every row in a uniform manner. When orifices are used the application rates are more uniform from one row to the next, and from one end of the planter to the other.

MANIFOLDS WITH ORIFICE BODIES (PRESSURIZED SYSTEMS)

While manifolds with orifice bodies are relatively trouble-free, there are a few things we need to check to achieve uniform performance.

- **Check orifices for cracks:** Plastic orifices can crack, and when pressure from the system is applied, the cracks opens up and an excessive rate of fertilizer is applied. Also check for bent or missing orifices.
- **Check for clogging:** Orifice bodies should be checked periodically to insure dirt isn't clogging or partially clogging the orifice. Clean those that may be clogged, and then be sure to reinstall the orifices properly. Check to be sure they do not fall out during reassembly, as this leads to a very high rate of application.
- **Check the lines from the manifold to each row:** These should be quarter inch microtubing for best performance at the 3-6 gallon/acre rates of application. Look for cracking, pinching from planter iron, and abrasions. If the planter sits outside, check for deer chewing on the lines. Short sections of tubing can be spliced in if necessary, or the entire length can be replaced. So called 'one pound' flow restrictors should be applied as close as possible to the outlet in or near each planter unit. The restrictor reduces surging in the rate of flow during application and stops 'dribble-out' when turning around on the field ends. Many orifice bodies already contain a flow restrictor at the manifold to stop 'dribble-out' and siphoning.
- **Use a flow monitor to insure all rows are receiving the same rate of fertilizer:** In the absence of a flow monitor, all rows should be calibrated regularly. For best results, application rates should not vary more than 5% from one row to any other row.
- **Replace fertilizer line with the same size and type as originally installed.**



This photo illustrates a typical manifold setup to accurately meter PureGrade liquid fertilizers. An orifice body for each row on the planter or drill is required. In the background is a ground drive piston pump that supplies fertilizer under pressure to the manifold. PureGrade fertilizers flow easily at low temperatures and are used at lower rates than many other liquid fertilizers, so many growers choose to use electric pumps because of their simplicity and lower cost.



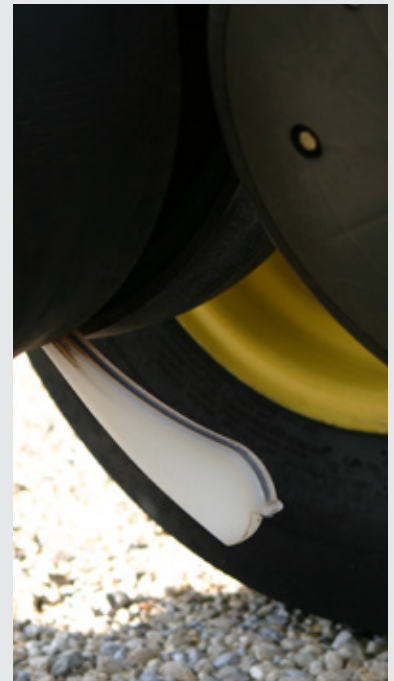
MANIFOLDS WITHOUT ORIFICE BODIES

Manifolds without orifices are designed to work best at higher application rates. For application rates in the 4-6 gallon/acre range some modifications may be needed to achieve desirable results. Rates of application may vary greatly from one end of the planter to the other when operated on strongly sloping fields.

- **Use a flow monitor to insure fertilizer delivery rates are uniform from one end of the planter to the other.**
- **Reduce line size to quarter inch microtubing to reduce potential surging.**
- **Install in-line orifices if possible.**
- **Fertilizer lines to each row should be the same length within 5% if no orifices are installed.** It is the friction or resistance to flow in the lines that keeps rates uniform from row to row. Any change in diameter or length of the fertilizer line alters the rate.
- **Pay special attention to the combination of pump speed and pressure to reduce tendency to surge at the 4-6 gallon/acre rate.**
- **Install 'one pound' flow restrictors as near to the outlet as possible at each row unit to reduce potential to surge and eliminate 'dribble-out' while turning.**
- **When replacing the fertilizer lines to the row units it is important that the replacement matches the other lines in diameter and length.** The lines to each row should be the same size. A slightly larger diameter or a shorter line will dramatically increase the flow rate due to less friction.

For many growers a quick check is all that is necessary. However, parts wear out or break over time. For best results from PureGrade fertilizers always be sure every row is receiving the planned rate of fertilizer.

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A fertilizer tube is mounted into the top of this seed firming device for easy, no fuss, row application of PureGrade liquid starter.

