



What is Dual Metering Tube and how does it work?

Dual Metering Tube is a flow distribution system that provides even row-to-row distribution over an extended flow range, with almost no plugging.

- ◆ There are 2 metering tubes to regulate and distribute the flow to each row. These are 1/4" OD tubes, 8' long, with varying inside diameters.
- ◆ The tubes have an inside diameter that is approximately 3 times as large as an orifice that might be used for a similar application.
- ◆ The product can flow through the small tube or through the large tube or through both tubes (three plumbing routes).
- ◆ The user can quickly and easily change from one distribution path to another.
- ◆ This allows the system to be adjusted to a range of application rates when moving from field to field, and allows even distribution as product viscosity changes due to temperature.



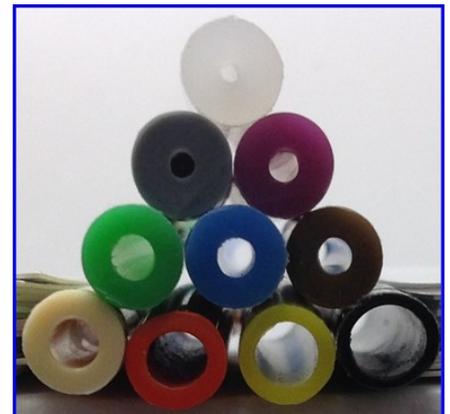
Here's how it works:

- ◆ Each row is plumbed with two different metering tubes.
- ◆ At each row is a set of dual 4-PSI check valves. These have easy-twist ON/OFF caps to turn each tube ON or OFF as desired.



Why is this Important?

- ◆ Plugging can be a big problem with orifices, especially for low-rate applications or in liquids with particulates.
- ◆ Identifying a plugged row may not happen quickly. Taking action to fix it may take longer, and is a messy process.
- ◆ Using metering tube with the larger, plug-resistant opening means you don't need to use a tight-mesh strainer. This is not a small deal. Tight-mesh strainers cause flow restrictions, especially when using cold fertilizer. A tight-mesh strainer can shut down your system. SurePoint routinely uses a 20-mesh strainer for our hydraulic pump systems, and a 30-mesh strainer for our electric pump systems.
- ◆ You have 3 plumbing routes at your disposal: small tube, large tube, or both tubes. This gives you a lot of flexibility built in to your plumbing so you can handle multiple scenarios without a messy job of changing orifices. You keep going and applying accurately to every row.



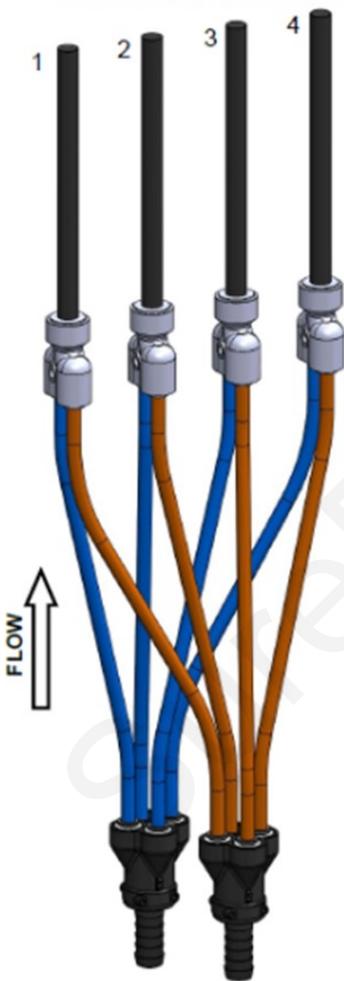
What is LiquiShift and how does it work?

LiquiShift is a variable flow distribution system that works over a wide flow range, handling a wide range of speed and rate with even row-to-row distribution.

- ◆ There are 2 metering tubes to regulate and distribute the flow to each row.
- ◆ The product can flow through the small tube or through the large tube or through both tubes.
- ◆ The SurePoint LiquiShift module switches between tubes on the go as the speed and/or rate change.
- ◆ This allows the system to adjust to a wide range of application rates and/or speed changes for variable rate prescriptions and /or high speed planters/implements.

Here's how it works:

Route to Flow Indicators / Sentinel Flow Module



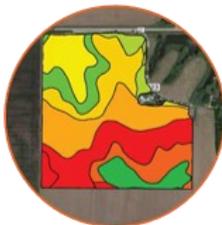
Plumb to "A"
Valves
Smaller DIA
Metering Tubes

Plumb to "B"
Valves
Larger DIA
Metering Tubes

- ◆ The flow starts in the small tube. As the flow increases due to increased rate and/or speed:
- ◆ When the pressure hits the High Setpoint, the flow switches to the large tube.
- ◆ As the speed and/or rate increase further, when the pressure hits the High setpoint again, the flow switches to both tubes.
- ◆ As the flow decreases due to lower speed and/or rate, and the pressure drops to the Low Setpoint, the flow switches from both tubes to the large tube, and then from the large tube to the small tube.
- ◆ All of this happens in an instant, on-the-go, automatically.

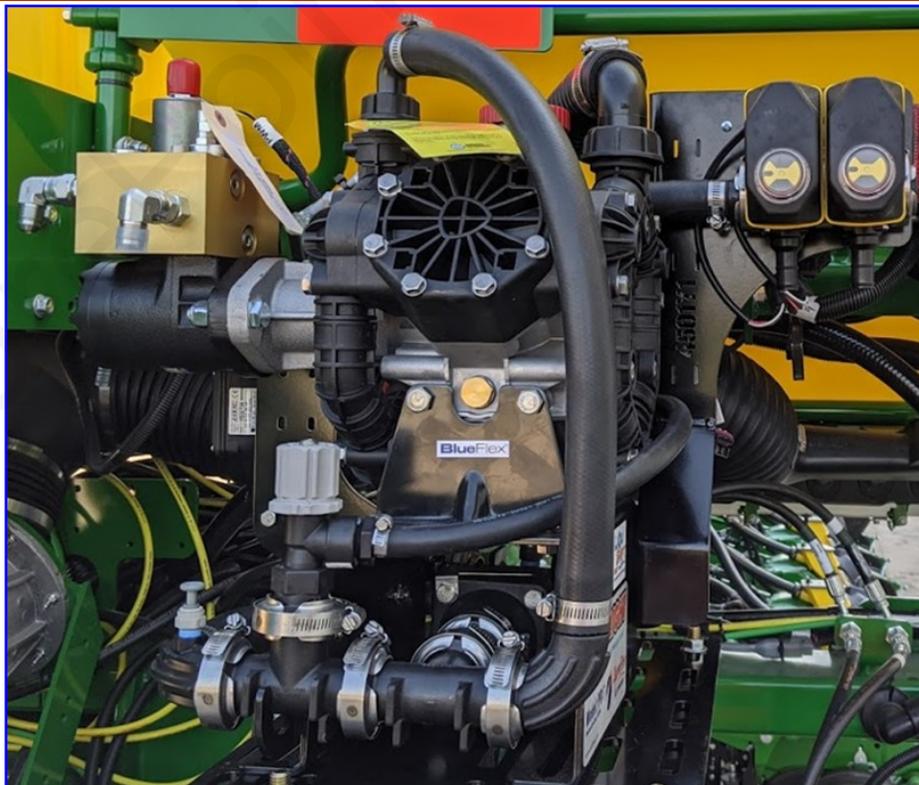
Why is this Important?

- ◆ A typical application system has a limited flow range because of the flow dynamics through an orifice.
- ◆ High speed planters/applicators require an expanded flow range just to cover the range of speeds possible with the equipment.
- ◆ Prescriptions that maximize crop input efficiency by putting a low rate in some areas and high rate in other areas require a system that has a wide flow range.
- ◆ Combine high speed planters/applicators with prescriptions or just with changing rates from field to field and flow range can become 6X or 8X or 10X. LiquiShift from SurePoint can do that.



Key features of Gen 3 LiquiShift

- ◆ Simplified Plumbing
- ◆ Zip Valve at each row
- ◆ Narrower section resolution - many times 1 or 2 rows per section, determined by number of sections the rate controller provides
- ◆ Eliminate spring diaphragm check valves
- ◆ Positive shut-off of each row
- ◆ Even greater row-to-row accuracy
- ◆ Simplicity means less downtime. Just 2 valves to switch between tubes.
- ◆ Works with 20-mesh strainer
- ◆ Virtually no plugging with metering tube



SENTINEL

ROW CONTROL

What is Sentinel Row Control and how does it work?

Sentinel Row Control is a variable flow distribution system that works over a wide flow range, handling a wide range of speed, rate, row spacing, and products with flow measured and controlled to each row with great accuracy.

- ◆ Utilizing the Sentinel Rate Control ECU for overall system operation and control, and the Sentinel Flowmeter module with an electromagnetic flowmeter for each row, the Sentinel Row Control system measures and controls the flow going to each row.



Here's how it works

- ◆ The Sentinel Row Control Interface Module compares the flow needed at that time and the flow measured by the row flowmeter to control a valve at each row.
- ◆ A row or rows can be disabled if there are rows you do not want to apply.



- ◆ The rate on a row or on several rows can be set differently than the rate on the other rows. Up to 4 rates can be set at one time.

Why is this Important?

- ◆ Sentinel Row Control works over a large flow range..
 - ◆ Low range is 0.10 gpm per row up to 2.0 gpm per row.
 - ◆ High range is 0.30 gpm per row up to 5.0 gpm per row.
 - ◆ Works with a 20-mesh strainer.
 - ◆ Works on many standard ISOBUS displays.
- ◆ On some newer displays it is possible to map As Applied by Row.

