

TRAILER SPRAYER

TSF-660

TSF-1060/TSF-1080/TSF-1090

TSF-1260/TSF-1280/TSF-1290



SPRAYER / BOOM MAINTENANCE

Proper servicing and maintenance is the key to the long life of all farm equipment. With careful and systematic inspection of your sprayer, you can avoid costly maintenance, downtime and repair.

- 1.) After several hours of operation, check sprayer for loose bolts, pins and hose clamps.
- 2.) Check hoses, pumps, valves and fittings for leaks. Always wear rubber gloves when making repairs and adjustments.
- 3.) Clean nozzles with an air hose with less than 30 P.S.I. periodically check nozzle flow & pattern. Replace defective nozzles, (if three or more are defective, replace complete set.)
- 4.) Keep elevator slide pads properly adjusted. Lubricating slide pads with grease may cause dirt accumulation that jams elevator. If necessary, use silicone spray on slide pads.
- 5.) Reference the operator's manual (lubrication section) for all grease locations and intervals.
- 6.) Check for proper air pressure in the sprayer tires. 22 P.S.I. is recommended for the 13.6 X 38 tires, and 36 P.S.I. is needed for the 14.9 X 46 tires.
- 7.) If equipped with a foam marker, clean the air filter on the air pump no less than once a week, and even more often in extreme conditions.

ADJUSTMENTS BEFORE GOING TO THE FIELD

- 1.) Securely hitch the sprayer to the tractor and fasten the safety chain. Make sure the hitch is adjusted so that the front of sprayer is 1½" lower than the rear so that liquid in the tank will drain to the sump.
- 2.) Fill sprayer ½ full with water for calibrating purposes.
- 3.) Hook-up the pump to the tractor. Engage the pump slowly and check for any leaks.
- 4.) Set the deadhead pressure of the pump at 80 P.S.I.

Hydraulic Driven Pumps

- A. To determine the correct flow rate to the hydraulic motor, start out with the hydraulic control valve set at a minimum flow, and the hydraulic lever in the float position.
- B. Open up the sprayer control valve to its maximum setting. (On the Raven 440 or 450 monitor, with the power switch on and the boom master switch on, the rate switch must be placed in the manual position, and the increase/decrease switch must be pushed to increase for 10-12 seconds.)
- C. Start the tractor and engage the pump by placing the hydraulic lever in the down position. Once the system builds pressure on the nozzle pressure gauge, speed up the tractor throttle to normal operating speed. Shut off the boom section switches and close the agitation valve.
- D. The pump is now at deadhead pressure and the hydraulic control valve must be adjusted up until the spray pressure reaches 80 P.S.I. maximum on the nozzle pressure gauge. Mark this setting on the hydraulic control valve for future reference.
- E. Open up the agitation valve.

PTO Driven Pumps

- A. Open up the sprayer control valve to the maximum setting. (On the Raven 440 or 450 monitor, with the power switch on and the boom master switch on, the rate switch must be placed in the manual position, and the increase/decrease switch must be pushed to increase for 10-12 seconds.)
 - B. Start the tractor and engage the PTO pump slowly with the tractor engine idling. Once the system builds pressure on the nozzle pressure gauge, shut off the boom section switches, and close the agitation valve.
 - C. The pump is now at deadhead pressure. Increase the engine RPM's until the spray pressure reaches 80 P.S.I. maximum on the nozzle pressure gauge or the PTO speed reaches the rated RPM (540/1000). Never exceed the rated tractor PTO RPM. This is the RPM needed to spray at to prevent excess pressure on the sprayer's plumbing.
 - D. Open up the agitation valve.
- 5.) Calibrate sprayer. Sprayer calibration (1) prepares your sprayer for operation, and (2) diagnoses nozzle wear. This will give you optimum performance from your nozzles and ensure accuracy from your sprayer.

Equipment Needed:

Calibration Container

Calculator

Stopwatch or wristwatch w/second hand.

Step # 1

Measure off a 200' course in the area to be sprayed or in an area with similar surface conditions. Select the engine throttle setting and gear that will be used when spraying. The starting post should be far enough away to permit your tractor/sprayer to reach desired spraying speed. Hold that speed as you approach the "start" marker, and check the time required to travel through the course to the "end" marker. Repeat the above procedure, and average the times that were recorded. Use the following equation to determine the exact ground speed:

$$\text{Speed (MPH)} = \frac{\text{Distance (ft.)} \times 60}{\text{Time (seconds)} \times 88}$$

$$\begin{aligned} \text{Example: MPH} &= \frac{200 \times 60}{27 \times 88} \\ \text{MPH} &= \frac{12000}{2376} \\ \text{MPH} &= 5.05 \end{aligned}$$

Step # 2

Determine the application rate at which your chemical should be sprayed. In determining which spray nozzles to use with your sprayer, you must know:

- | | |
|----------------------------------|------------------|
| (1) Nominal application pressure | _____ P.S.I. |
| (2) Target application pressure | _____ GPA |
| (3) Target speed | _____ MPH |
| (4) Nozzle spacing | _____ W (inches) |

Using this information, calculate the volume per minute, per nozzle as follows:

$$\text{GPM} = \frac{\text{GPA} \times \text{MPH} \times \text{W (nozzle spacing)}}{5,940}$$

Example:	(1) Application Pressure =	<u>30 P.S.I.</u>
	(2) Application Rate =	<u>20 GPA</u>
	(3) Target Speed =	<u>5.0 MPH</u>
	(4) Nozzle Spacing =	<u>20 Inches</u>

$$\text{GPM} = \frac{20 \text{ GPA} \times 5 \text{ MPH} \times 20 \text{ W (inches)}}{5,940} = .34$$

Using GPM .34 and pressure 30 P.S.I., you would select a nozzle from your nozzle chart that comes closest to providing the desired output.

Step # 3

Turn on your sprayer and adjust the pressure. Operate the sprayer at desired pressure and catch the discharge in the calibration container for one minute. Divide 128 into the number of ounces caught to determine gallons per minute (GPM) per nozzle. 128 fluid ounces equals one gallon.

$$\begin{aligned} \text{Example: OPM (ounces per minute)} \div 128 &= \text{GPM (gallons per minute)} \\ 44 \text{ OPM} \div 128 &= .34 \text{ GPM} \end{aligned}$$

Step # 4

Determine your nozzle spacing in inches. **Example: 1 nozzle every 20 inches.**

Solution:

$$\text{GPA (Gallons per acre)} = \frac{5,940 \times \text{GPM (per nozzle)}}{\text{MPH} \times \text{W (nozzle spacing)}}$$

$$\text{Example: } \text{GPA} = \frac{5,940 \times .34}{5.05 \times 20}$$

$$\text{GPA} = \frac{2020}{101}$$

$$\text{GPA} = 20$$

The above information will assure you of a check for accurate application in the event there is an error in the gauge, nozzle spacing, nozzle height, tractor speed, or nozzle wear. Since all tabulations are based on spraying water, conversion factors must be used when spraying solutions which are heavier or lighter than water.

All Raven 440 or 450 Control Systems require either (1) Wheel drive speed sensor magnets, or (2) A Radar speed sensor. Calibration procedures for the speed sensor magnets can be found in the Raven 440 or 450 Manual. Calculation procedures for radar speed sensors are included with each radar unit dependent on make and model. Make sure to follow initial programming instructions (Step 3) of the Raven manual to select either **SP1-(wheel drive sensor)**, or **SP2-(radar sensor)**.

FIELD ADJUSTMENTS

1.) Boom Height

After calibrating the sprayer for the specific nozzle that will be used at a desired pressure and tractor speed, the main field adjustment is the boom height. Depending on which type of nozzle is being used, set the boom height so that the correct overlap for that specific nozzle is achieved. If the crop canopy is taller in some fields than others, adjust the boom height accordingly. Refer to the Nozzle Charts in the Application Guide to determine the height of the boom.

2.) Agitation Adjustments

The agitation valve is used to adjust the pressure to the agitation nozzles in the tank. Refer to the agitation gauge, and adjust the pressure to a desired rate. Different chemicals require different agitation pressures to keep the chemical in suspension. (See chemical label)

3.) Tank Straps

The tank straps that wrap around the sprayer tank may become loose after the first few hours of operation. This occurs when the tank settles in the saddle. Polyethylene tanks are especially susceptible to this. Retighten the tank straps to secure the tank.