

Sprayer Calibration

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The most important thing in preparing your sprayer for the season is calibration. Proper calibration is essential for safe, economical and effective pest control. Users should calibrate a sprayer prior to its initial use and periodically during operation. Factors which can cause variation in the rate of application are: (1) nozzle spacing on the boom or manifold, (2) ground speed, (3) nozzle type, (4) nozzle wear, and (5) pressure at the nozzle. All of these factors must be considered to calibrate a sprayer.

Nozzle spacing and nozzle type are designed into the spray rig and generally do not need to be changed. Nozzle orifice size and nozzle pressure can be varied to a desired nozzle flow rate. Nozzle wear should be checked periodically to prevent excessive increases of application rate. If nozzles vary within 10% of their specified flow rate, new nozzles should be installed. To check nozzle flow rate, measure flow from each nozzle to calculate gallons per minute and compare this to your nozzle flow rate charts. Remember, that as nozzles wear nozzle patterns change as well, reducing the distribution effectiveness.

Many of the decisions needed for sprayer calibration can be made long before you go to the field. First, select nozzle type and spacing: flat fan or flood nozzles for herbicides and hollow cone nozzles for insecticide fungicide application. Second, consult the chemical product label to determine the correct total application rate in gallons per acre. Third, select a speed to suit the equipment and field conditions. After you have made these decisions then it is easy to calculate the desired nozzle spray rate in gallon per minute (GPM) by using this formula:

$$\text{GPM} = \frac{\text{SPEED (MPH)} \times \text{NOZZLE SPACING (INCHES)} \times \text{GALLONS PER ACRE}}{5940}$$

From the calculated GPM, select the size of nozzle you need from the nozzle manufactures' catalog. You may have several choices so select a nozzle with the optimum pressure range in mind.

Once you have selected a nozzle tip and operation pressure it is almost time to go to the field. Before you begin, check your sprayer equipment to be sure that all components are clean and in good working condition. Make sure your pressure gauge is working accurately. It is also a good idea to have a pressure gauge mounted on the boom since catalog capacity charts are based on pressures at the nozzle.

To fine tune the sprayer for accurate application, collect water from several tips with the tractor parked, the tank full and the engine running at about the same speed to be used in the field. Adjust the sprayer's pressure regulating valve until the tip delivers the required GPM as calculated by the formula or calibration charts.

The last thing we have to do is to make sure that the sprayer is operated at the speed we selected in the beginning. Many times you can't trust the speedometer because of different tire sizes and wheel slip. If you are pulling a tillage implement during the spray operation, calibrate the sprayer speed with the tillage tool in operation because it will affect the speed. There are many short cuts and gimmicks used to measure tractor speed but all you need to do is measure time in minutes required to travel a known distance in feet. Then divide the distance in feet by the time in minutes and divide this number by 88 to convert to miles per hour. Adjust the engine throttle to the desired speed.

$$\text{MPH} = \text{DISTANCE (FEET)} / \text{TIME (MINUTES)} / 88$$

Now you are ready to mix the chemicals and start spraying. Always wear protective clothing and equipment as required by the chemical label to avoid chemical contact. Reducing errors saves chemical, time, potential health problems and money while providing the effective pest control you desire.