

# Sprayer Calibration Techniques

Calibrating a sprayer is critical to applying the correct amount of herbicide. Over application can injure desirable vegetation and under application can cause the noxious weeds to build up resistance to the chemical over time.

The following four links will help you calibrate:

- [Unraveling the Mysteries of Sprayer Calibration](#)
- [Back Pack Sprayer](#)
- [Handgun](#)
- [Boom Sprayer Refill Method](#)
- [Boom Sprayer Stationary Method](#)

**To calibrate a handgun** on a tank larger than a hand-carried sprayer use the following method.

(For hand-carried sprayers up to 3 gallons in size use the back pack sprayer method of calibration.)

Items you will need: measuring tape, flags/paint, bucket, stop watch, measuring container.

1. Measure and mark an area 18.5 feet by 18.5 feet square. This is 1/128<sup>th</sup> of an acre.
2. Fill the sprayer up with water.
3. Set the pressure at 35 to 40 psi.
4. Set the desired flow rate of the handgun.
5. Spray the area marked, keeping the time it takes to spray to wet the area.
6. Collect in a bucket for the length of time it took to spray the square.
7. Measure this amount.
8. This will give you a number in ounces, which is directly equivalent to \_\_\_\_\_ gallons/acre.
9. Divide this amount by the gallons in your sprayer. This tells you how much of 1 acre will be treated with a full sprayer tank. Be sure to put your answer into a fraction because you are measuring 1/128<sup>th</sup> of an acre; 1 over your answer = 1/\_\_\_\_\_
10. Multiply this percentage by the per acre rate and you will know how much chemical to put in your tank.

For example:

You have a 25 gallon sprayer

It took you 75 seconds to spray the 18.5' x 18.5' area

You collect 150 ounces in the 75 seconds.

Therefore, you are applying 150 gallons/acre

Divide the 150 by 25 gallons (the size of your sprayer) = 1/6 of an acre is being treated by your sprayer.

Now you can take 1/6 of the acre rate of chemical needed and place in your 25 gallon sprayer and know that you are using the correct amount of herbicide.

## **Refill Method for Boom Sprayer Calibration**

Items you will need: measuring tape, flags/paint, bucket, stop watch, measuring

container.

1. Fill the spray tank with water.
2. Measure the effective spray width of the boom. This is the width covered by the spray at the ground level.
3. Divide the effective width of the boom into 43,560 (square feet/acre) to determine the distance the sprayer must travel to cover an acre.
4. Measure and mark this distance on the ground. Since the distance required to spray is usually quite large, the common practice is to reduce the course to a fraction of an acre, i.e. 1/10 or 1/16 of an acre.
5. Re-fill the spray tank to a known reference line.
6. Spray the measured distance at a known and constant speed that is repeatable in the field.
7. Measure carefully the amount of water required to refill the tank to the reference line. It is desirable to make 2 or 3 runs to obtain more accurate calibration. Return the sprayer to exactly the same spot each time.
8. Multiply the number of gallons required to refill the tank to the previously designated reference line by the reciprocal of the fraction of an acre sprayed (1/10, 1/16, 1/4, etc.) to determine the delivery rate in gallons per acre (GPA) at the speed and pressure utilized.

For example: A sprayer with a 20 foot effective spray width is calibrated on 1/10 of an acre and requires 4 gallons of water to refill the tank after the calibration run.

To determine the GPA

$$43,560/20 \text{ ft} = 2,178 \text{ feet}$$

$$\text{Linear feet necessary to cover } 1/10 \text{ of an acre} = 218 \text{ linear feet}$$

$$4 \text{ gallons to refill times } 10 \text{ (reciprocal of } 1/10) = 40 \text{ GPA}$$

You will spray 40 gallons per acre. Divide the GPA into the number of gallons of water you have in your tank and this will give you how many acres a tank will treat.

### **Stationary Calibration Method for Boom Sprayers**

1. Fill the spray tank approximately 1/2 full with clean water. If a drift control agent will be used during the application, calibrate with drift control agent.
2. Measure the swath width (SW) in inches.
3. Collect the spray output from the nozzle(s) for 1 minute. Measure the volume collected in fluid ounces and divide by 128 to determine gallons per minute (GPM).
4. Select the speed, in miles per hour, that will be used for spraying.
5. Determine the gallons per acre (GPA) being applied, using a large output nozzle or a cluster of nozzles.

$$\text{GPA} = \frac{5940 \times \text{GPM}}{\text{mph} \times \text{SW (in inches)}}$$

or

$$\text{GPA} = \frac{\text{GPM} \times 495}{\text{mph} \times \text{SW (in feet)}}$$

6. Chemical needed =  $\frac{\text{chemical rate} \times \text{tank volume (in gallons)}}{\text{GPA}}$