



The University of Georgia
Cooperative Extension Service
College of Agricultural and Environmental Sciences

Hand Sprayer Calibration for Ornamental and Turf

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Hand sprayers are often used to treat ornamental or small areas of turf. The directions on many ornamental pesticide product labels say to "spray until foliage is wet" or perhaps "spray until runoff." Unfortunately, these directions are subject to each applicator's interpretation of what "wet" or "runoff" is.

Recommendations are based on amount per 100 gallons. This is the dilution ratio for the chemical applied. Use the following to convert 100 gallon rate to bed area rate.

1. Measure the length and width of the area to be sprayed. Then calculate the area to be covered.

Bed Area is: length _____ X width _____ = _____ ft²

2. Fill sprayer with water and spray the area. Record the amount of water to refill the sprayer.
Gallons per bed area _____

3. Obtain the rate of material to be applied per 100 gallons.

Rate _____

4.
$$\frac{\text{Rate} \times \text{Gallons per bed area}}{100} = \text{Amount per bed area}$$

5. Calculate the total amount of material to be used for the application (total bed area) as follows:

$$\frac{\text{Amount per bed area}}{\text{Bed area (ft}^2\text{)}} \times \text{Area to be Sprayed (ft}^2\text{)} = \text{Amount of material}$$

6. Total solution to prepare is:

$$\frac{\text{Gallons per bed area}}{\text{Bed area (ft}^2\text{)}} \times \text{Area to be sprayed (ft}^2\text{)} = \text{Total Solution}$$

Solutions derived from the above may need to be converted to smaller units in order to accurately measure the pesticide. Refer to the conversion section to help simplify this problem.

Conversions:

Volume

pints x 16 = fluid ounces (fl oz)
fl oz x 29.57 = milliliters (ml)
gallon x 4 = quarts (qts)
quarts x 2 = pints (pts)
fl oz x 2 = Tablespoons (tbs)
tbs x 3 = teaspoons (tsp)
tsp x 5 = milliliters (ml)

Weight

pounds x 16 = weight ounces (wt oz)
wt. ounces x 28.35 = grams (g)
grams x 1000 = milligrams (mg)

EXAMPLE

Chris Tree wanted to spray atrazine, as Aatrex 80W (the "W" indicates the herbicide is in a wettable power form), in his 20-acre white pine Christmas tree farm. He filled his 4-gallon back-pack sprayer half full with water, installed a 15-p.s.i. (pounds per square inch) pressure spring in the regulator, and attached an even-flat-fan nozzle. Holding the nozzle at a constant height, he then sprayed 50 foot section and measured the ESW at several points. His average ESW was 36 inches. Mr. Tree obtaining the calibration distance for Table 1, marked a 113 foot calibration in his tree farm. He then traveled 4 times the calibration distance measuring the time in seconds. The times were 21, 24, 23, and 24 seconds. His average travel time was 23 seconds. He then measured the flow from the nozzle four times in ounces. His average collection was 18.34 ounces or 18.34 GPA.

This is well within the 10-20 gallons/acre carrier rate suggested.

Chris wanted to spray a 3-foot band over his trees, which are planted 5 feet apart in the row and 8 feet between rows in the 20-acre plantation. Since he is spraying 3 feet of every 8 feet, he will need enough chemical to spray $\frac{3}{8}$ (or 0.375) x 20 acres = 7.5 acres. His Extension agent recommended spraying 5 pounds active ingredient of atrazine per acre. The label of Aatrex 80W says it is 80% active ingredient. Since Chris's sprayer holds 4 gallons/tank, he can cover:

$$\frac{4 \text{ gallons/tank}}{18.34 \text{ gallons/acre}} = 0.218 \text{ acres/tank}$$

He will need:

$$\frac{5 \text{ pounds a.i./acre}}{0.80} = 6.25 \text{ pounds/Aatrex per acre}$$

Then, $6.25 \text{ pounds/acre} \times 0.218 \text{ acre/tank} = 1.36 \text{ pounds Aatrex}$, which should be added to each 4-gallon tankful to get the rate he desires. As a check on calculations, he will need $6.25 \text{ pounds/acre Aatrex} \times 7.5 \text{ acres} = 46.9 \text{ pounds of Aatrex}$. Then, since he can cover 0.218 acres/tank, he will need:

$$\frac{46.9 \text{ pounds}}{1.36 \text{ pounds/tank}} = 34.4 \text{ tanks}$$

Then $34.4 \text{ tanks} \times 1.36 \text{ pounds/tank} = 46.9 \text{ pounds Aatrex}$, which matches the above calculation.

Accurate sprayer calibration is essential to a successful application. Following the simple calibration steps described herein will ensure that your time and money will not be wasted on an application that does not give the desired results.

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