

Sprayer Calibration

Calibration of your spray equipment is critical. It should be done whenever you change chemicals to ensure application of proper dosages. Applying too little can be costly and ineffective; applying too much is illegal.

Adjustable factors which affect application rate are: **speed**, **spray pressure**, and **nozzle size/type**. Speed is the easiest and most common adjustment. Use only water when calibrating.

Calibration Method 1

1. Measure nozzle flow rate: $\text{gal/nozzle/min} = \frac{\text{ounces collected in 1 minute from 1 nozzle}}{128}$

2. Calculate gallons per acre: $\text{gal/ac} = \frac{\text{gal/nozzle/min} \times 12 \times 43,560}{\text{nozzle spacing (in.)} \times \text{speed (ft./min)}^*$

*ft./min = MPH x 88

Calibration Method 2

1. Fill spray tank. Travel 660 feet while spraying at the desired speed and pressure
2. Determine the amount of water discharged by measuring the amount of water needed to refill the tank
3. Calculate gallons per acre: $\text{gal/ac} = \frac{\text{gallons discharged} \times 66}{\text{swath width (ft.)}}$

Calibration Method 3

1. Fill spray tank. Travel a predetermined number of feet while spraying at the desired speed and pressure
2. Determine the amount of water discharged by measuring the amount of water needed to refill the tank
3. Calculate gallons per acre: $\text{gal/ac} = \frac{\text{gallons discharged} \times 43,560}{\text{distance sprayed} \times \text{swath width (ft.)}}$

Other Useful Formulas

$$\text{Gallons or pounds of ai needed} = \frac{\text{acres to spray} \times \text{lb ai/ac}}{\text{lb ai/gal or ai/lb}}$$

$$\text{Pump capacity (gal/min) needed} = \frac{\text{desired spray volume (gal/ac)} \times \text{boom width (ft)} \times \text{speed (MPH)}}{495}$$

$$\text{Nozzle capacity (gal/min) needed} = \frac{\text{spray volume (gal/ac)} \times \text{nozzle spacing (in.)} \times \text{speed (MPH)}}{5,940}$$

$$\text{Liquid product (gal of product/ac) needed} = \frac{\text{rate (lb ai/ac)}}{\text{lb ai/gallon of formulation}}$$

$$\text{Dry product (lb of product/ac) needed} = \frac{\text{rate (lb ai/ac)}}{\% \text{ ai in formulation}}$$

Useful Weights and Measures

Conversions

Liquid

6 teaspoons (**tsp**) = 2 tablespoons (**tbsp**) = 1 fluid ounce (**fl oz**)

1 ounce = 29.57 milliliters (**mL**)

16 ounces = 2 cups (**c.**) = 1 pint (**pt.**) = 473.2 milliliters

2 pints = 1 quart (**qt.**) = 0.9463 liter (**L**)

1 liter = 1,000 milliliters = 1.057 quarts

1 gallon (**gal.**) = 4 quarts = 8 pints = 128 ounces = 3.785 liters

Dry

1 pound (**lb**) = 16 ounces (**oz**) = 454.59 grams = 0.4536 kilograms

1 kilogram (**kg**) = 1,000 grams (**g**) = 2.2 pounds

1 ton = 2,000 pounds = 0.9078 metric tons

Linear

1 yard (**yd**) = 0.9144 meters (**m**)

1 meter = 100 centimeters (**cm**) = 39.37 inches (**in.**)

1 mile (**mi.**) = 1,760 yards = 5,280 feet (**ft.**) = 1.61 kilometer (**km**)

1 kilometer = 1,000 meters = 0.62 miles

1 acre (**A** or **ac**) = 43,560 square feet (**sq ft.** or **ft.²**) = 0.405 hectares (**ha**)

1 hectare = 2.471 acres

1 acre = a swath 8.25 feet wide, one mile long

1 acre = a swath 16.5 feet wide, 1/2 mile long

1 acre = a swath 33 feet wide, 1/4 mile long

1 section = 640 acres

1 township = 36 sections = 23,040 acres

Speed

1 mile per hour (**mph**) = 88 feet per minute = 1.46 feet per second

Acreage of row crops =

$$\frac{(\text{row length in feet}) \times (\text{row width in inches}) \times (\text{number of rows})}{522,720}$$