

Herbicide Sprayer Calibration Worksheet

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Calibration is simply the accurate determination of the spray volume delivered by the sprayer and verification that the spray pattern is correct. A sprayer that is not properly calibrated may result in wasteful and harmful over-application of the herbicide, or reduced effectiveness due to under-application. Herbicide sprayers should be calibrated at least once per season, more often if the sprayer is used frequently.

Materials Needed:

- 100 ft tape measure
- Stopwatch
- Containers to catch nozzle output, calibrated in fluid oz.
- Chemical resistant gloves
- Labels or tape, pen or pencil
- Calculator
- Wrenches
- Spray nozzle catalogue

1. Check nozzle operation and spray pattern.

- a. Determine if nozzles are appropriate style for upcoming application
- b. For broadcast application, all nozzles should be the same style and size
- c. Clear plugged nozzles and nozzle screens
- d. Adjust nozzle orientation and boom height for correct coverage.

2. Determine nozzle output

- a. Fill spray tank with clean water
- b. Operate the sprayer at nozzle manufacturer's standard operating pressure (usually 40 psi)
- c. Collect spray output from each nozzle for exactly 15 seconds
- d. Measure spray output from each nozzle and multiply by 4 to determine nozzle output in gallons/minute (usually a fraction of a gallon/minute)

Nozzle	Output 15 sec (fl oz)	Multiply by 4	Equals Output (fl oz/min)	Divide by 128 fl oz/gal	Equals Output (gal/min)
1		X 4	=	÷ 128	=
2		X 4	=	÷ 128	=
3		X 4	=	÷ 128	=
4		X 4	=	÷ 128	=
					Average =

- e. Replace nozzles that are off-type or those having output 10% greater than the manufacturer's output rating for the nozzle at standard pressure
- f. Repeat nozzle output check after replacing nozzles
- g. Calculate and record average nozzle output

Average Nozzle output _____ gal/min

3. Determine width of spray application

- a. Broadcast: width of combined spray pattern of all nozzles
- b. Band: width of individual nozzle spray pattern

Spray width _____ ft

4. Determine tractor speed

- a. Determine tractor speed by operating tractor over a measured course within the vineyard using your preferred gear and throttle settings, spraying water at standard pressure. Record gear and throttle settings, and spray pressure.

Gear _____ Throttle _____ rpm Pressure _____ psi

- b. Measured course can be a full vineyard row of measured distance or a course of defined length such as 100 ft
- c. Record the time required to travel the measured course while spraying water

Tractor speed _____ ft/min

5. Calculate sprayer output

$$\frac{\text{Nozzle output (gal/min)} \times \text{no. nozzles} \times 43,560 \text{ ft}^2/\text{acre}}{\text{Tractor speed (ft/min)} \times \text{Spray width (ft)}}$$

$$\frac{\text{_____ gal/min} \times \text{___ (no. nozzles)} \times 43,560 \text{ ft}^2/\text{acre}}{\text{_____ ft/min} \times \text{_____ ft}} = \text{gal/acre}$$

Sprayer output: _____ gal/acre

8. Determine area covered by one full spray tank

Sprayer tank capacity _____ gal

$$\begin{array}{l} \text{Treated Area covered} \\ \text{by full spray tank (acres)} \end{array} = \frac{\text{Sprayer tank capacity (gal)}}{\text{Sprayer output (gal/acre)}}$$

$$\begin{array}{l} \text{Treated Area covered} \\ \text{by full spray tank} \end{array} = \frac{\text{_____ (gal)}}{\text{_____ (gal/acre)}} = \text{_____ acres}$$

9. Preparing the Spray Mixture

$$\begin{array}{l} \text{Treated Area covered} \\ \text{by full spray tank} \end{array} \text{ _____ acres} \quad \times \quad \begin{array}{l} \text{Herbicide rate} \\ \text{(from label)} \end{array} \text{ _____ (pints, oz per acre)}$$

EXAMPLE 1. Many Acres To Treat

Area 14.0 acres
 Sprayer output 22.8 gal/acre
 Spray tank capacity 80 gallons
 Herbicide rate 4 pints/acre

$$\begin{array}{l} \text{Treated Area covered} \\ \text{by full spray tank} \end{array} \text{ 3.5 acres} \quad \times \quad \begin{array}{l} \text{Herbicide rate} \\ \text{(from label)} \end{array} \text{ 4 pints per acre}$$

3.5 acres X 4 pints/acre = 14 pints herbicide plus water to make 80 gal spray mixture

14 acres ÷ 3.5 acres (full tank coverage) = 4 full tanks needed to cover 14 acres

EXAMPLE 2. Small Acreage To Treat or Partial Tank

Area 1.3 acres
 Sprayer output 22.8 gal/acre
 Spray tank capacity 80 gallons
 Herbicide rate 4 pints/acre

1.3 acres X 4 pints/acre = 5.2 pints herbicide

1.3 acres X 22.8 gal/acre = 29.6 gal spray mixture (herbicide plus water)