Calibrating Air Blast and Weed Sprayers

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Grower: _____ **Date:** _____

The basic steps in calibrating a sprayer are listed below. Use #1 to set up the sprayer to deliver the desired application rate. Then use #2-4 to ground-truth the application rate by measuring it.

1. Estimate Flow Rate (from published manufacturer data)
2. Measure Flow Rate
3. Calculate Land Rate
4. Calculate Amount of Pesticide to Put in Tank

Sprayer Type:_____

Check: _____ 1. Filter screens and strainers clean?
_____ 2. Tank clean and free of scale and sediment?
_____ 3. Pressure gauge operating properly?
_____ 4. Nozzles working properly?

Universal Equation
(This formula works for all applications)

Application Rate (gal./sq. ft.) = **Flow Rate (gal./min.) ÷ Land Rate: speed (ft./min.) x width (ft.)**

Application Rate (gal./acre)= **Flow Rate (gal./min.) ÷ Land Rate (acre/min.)**

1. **Estimate Flow Rate (gal./min.)** – Using the charts from the manufacturer's catalog
Note the pressure for which the nozzle output is rated at the top of the columns below.

LEFT Manifold	Nozzle Type	Nozzle Size	Rated Output (gal./min.) @ _____ psi	RIGHT Manifold	Nozzle Type	Nozzle Size	Rated Output (gal./min.) @ _____ psi
1				1			
2				2			
3				3			
4				4			
5				5			
6				6			
Total Left Output				Total Right Output			

TOTAL (Right + Left) Estimated Flow Rate = _____ gal./min.

Draw diagram of spray boom and nozzle numbers on the back of this page.

Calibrating Air Blast and Weed Sprayers

2. Measure Actual Flow Rate

WEED SPRAYER:

1. Park sprayer on level ground
2. Fill tank about 1/2 full
3. Turn on sprayer with nozzles open and run at normal operating pressure
4. Place measuring cup under a nozzle to catch the flow for a period of time (T) T = _____ sec.

   T x 1 min./60 sec. T = _____ min.
5. Record volume collected during that time (V) and units (ml. or oz.) V = _____ unit? __
6. Calculate volume in gallons for that nozzle V = _____ gal.

   1 gal. = 4 qts. = 8 pts. = 128 fl. oz.

   1 gal. = 3.8 L 1 L = 0.264 gal.
7. Calculate flow rate (gal/min) for that nozzle V(gal.)/T(min.) = _____ gal./min.
8. Repeat steps 4 -6 for each nozzle
9. Record actual flow rate for all nozzles @ _____ psi:

LEFT Manifold	Nozzle Type	Nozzle Size	Flow Rate (gal./min.)	RIGHT Manifold	Nozzle Type	Nozzle Size	Flow Rate (gal./min.)
1				1			
2				2			
3				3			
4				4			
5				5			
6				6			

TOTAL Actual Flow Rate = _____ gal./min.

AIR BLAST SPRAYER:

1. On level ground, fill sprayer completely
2. With tractor stationary, bring tractor RPM up to sprayer PTO speed (typically 540)
3. Open nozzles and run for a period of time (T) T = _____ min.
4. Check pressure while nozzles are open. Record operating pressure: _____ psi
5. Refill the tank completely, measuring the amount of water used in gallons (G) G= _____ gal.
6. Calculate actual flow rate G/T = _____ gal./min.

Calibrating Air Blast and Weed Sprayers

3. Calculate Application Rate Tractor model: _____

A. Measure tractor speed

1. Establish a distance (at least 100 ft.) and flag it – in crop rows best

D = [ ] ft.

2. Fill sprayer tank at least 1/2 full

B. Measure the time it takes for the sprayer to travel the distance

Do 3 times and average

1st run _____ sec.

2nd run _____ sec.

3rd run _____ sec.

Average (T) = [ ] sec.

Convert seconds to minutes: T [ ] sec. x 1 min./60 sec.

T = [ ] min.

C. Calculate speed traveled (D/T)

In ft./min.: D/T = [ ] ft./min.

In MPH: (D/Tmin.) ÷ 88 = [ ] mi./hr.

D. **WEED SPRAYER**: Determine swath width (W) with tractor sitting on level dry surface and sprayer at planned operating pressure.

1. Turn on nozzles (with water) and measure width of spray pattern. Remember to measure the swath width using the same nozzles that were used to measure the flow rate.

W = [ ] ft.

D. **AIR BLAST SPRAYER**: Swath width (W) for an air blast sprayer is the between-row spacing, or 2 rows for double-row vineyard sprayers.

W = [ ] ft.

E. Calculate land rate (LR): Speed (ft./min.) x Width (ft.)

Speed [ ] ft./min. x Width [ ] ft. = LR [ ] $ft.^2$/min.

Convert to acres/min.:

1 acre/43,560 $ft.^2$ x LR ($ft.^2$/min) = [ ] acre/min.

F. Calculate application rate

Application Rate (gal./acre) =

Flow Rate [ ] (gal./min.) ÷ Land Rate [ ] (acre/min.)

Application Rate = [ ] gal./acre

Calibrating Air Blast and Weed Sprayers

4. Calculate amount of pesticide to put in tank

A. How many acres can one tank spray?

Tank Capacity [ ] gal. ÷ Application Rate [ ] gal./acre

= [ ] Sprayed Acres/Tank

B. Amount of pesticide/tank:

Recommended amount of pesticide/acre [ ] x acres/tank [ ]

= [ ] Pesticide/Tank