

Backpack Calibration: the 1/128th Method

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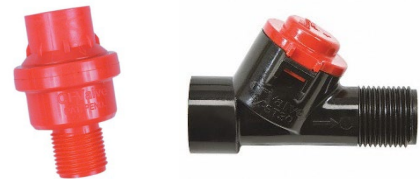
By using the 1/128th method, there is almost no math required to calibrate a backpack sprayer. It is a simple method that can be done in 15 minutes, with the longest part being step 1, laying out the test area.

1. Create a Test Spray Area

Measure out an 18.5x18.5-foot square, which is approximately 1/128th of an acre. Mark the four corners with flags, stakes, or cones.

2. Install a CF-Valve on the wand

A constant flow valve (CF-Valve) ensures constant pressure and therefore the same amount of fluid coming from the nozzle. Without the CF-Valve, the faster someone pumps the arm of the sprayer, the higher the pressure and the more spray from the nozzle. CF-Valves ensure the same pressure and rate.



3. Time Your Spray

1. Fill the backpack sprayer with clean water.
2. Starting in one corner, spray the entire square and record the time it took to complete. Walk at the same pace you would when spraying and always walk backwards to avoid walking through your sprayed area. Consider using a metronome or downloading a metronome app that can help you keep a regular pace.
3. If using a manual pump backpack sprayer *without* a CF-Valve, try to maintain consistent pump intervals to maintain pressure. Alternatively, backpack sprayers can be motorized and equipped with pressure gauges.
4. Look at the pattern of spray to make sure there is an even spray distribution and not worn nozzles.

Time to spray square: _____ seconds

4. Calculate Volume of Spray Used

1. In a bucket, spray for the same time as record above. Again, make sure to keep constant pressure.
2. Measure the volume of liquid in a graduated cylinder or measuring cup with ounce measurements.

Volume sprayed: _____ ounces

5. Convert to Gallons per Acre (GPA)

No math required! Because the area sprayed is 1/128th of an acre and there are 128 ounces in a gallon, the volume directly translates to GPA. For example, if 30 ounces was collected in the time to spray 1/128th acre, then the spray is being applied at a rate of 30 gallons per acre.

6. Calculate Area Treated by a Tank

Many backpack sprayers have a tank that holds only 3-4 gallons. To determine how much a full tank will treat, divide the rate in GPA by the capacity of the sprayer. In this case, if the rate is 30 GPA and the tank size is 3 gallons, then 3 gallons/30 GPA is 0.1 acre being sprayed for each full tank.

7. Calculate Amount of Chemical for the Tank

Chemicals are applied at a per acre rate. The amount of material to put in the sprayer is the rate on the label times the area sprayed by a full tank. For example, the label indicates a rate of 32 oz/acre x 0.1 acre sprayed for each backpack = 3.2 oz should be put in the 3-gallon sprayer.

Other Tips

Maintaining constant pace is important to applying the same rate. Using a metronome is one way, but pacing in a known distance is also possible. The chart below can be used to help set a pace.

Converting the time (seconds) needed to walk 100 feet to miles per hour (mph)	
Sec/100 ft	Mph
68	1.0
45	1.5
34	2.0
27	2.5
23	3.0
19	3.5
17	4.0
15	4.5
14	5.0
$\text{Mph} = \frac{\text{distance (ft)} \times 60}{\text{time (sec)} \times 88}$	

Table from Landgreen, C.G. Calibrating and using a backpack sprayer. Pacific Northwest Extension Publication PNW 320, November 1987.