

Hand Sprayer Equipment Calibration



Calibration

Calibration is the process used to determine the application rate of pesticide application equipment. Pesticides include chemicals used to control weeds, insects and disease. Calibration helps to ensure the proper amount of pesticide is applied. It is the key to successful pesticide use. Failure to calibrate equipment can result in ineffective applications. Applying too much pesticide is costly, unlawful and can injure non-target sites, animals and people. Applying too little spray can result in poor control of the targeted pest, may contribute to pesticide resistance and can make re-treatment necessary.

It is important to calibrate equipment on a regular basis to compensate for variations. Nozzles may become worn or damaged with use and result in inaccurate output and spray pattern. The pesticide label will give the application rate and suggested operating pressure and amount of carrier (water, oil, fertilizer) needed. Changes in speed during applications will also affect the application rate.

Handgun and Knapsack Sprayers



Handgun or knapsack sprayers are usually used for small areas, spot spraying, noxious weed patches, ornamentals, green houses, and right of way pesticide applications. These type or

sprayers generally have a single nozzle, however some can be adapted to hold a short boom with three or four nozzles. Compressed air pressure is used to force the pesticide solution from a supply tank to the nozzle. Calibration will help to achieve the desired results by ensuring proper pesticide application rates.

Product Label

Choose a product according to the suitable active ingredient, formulation, target pests, and sites where it can be used. Before applying product, read the label to ensure proper procedures and application rates are followed. The label will also provide proper storage and disposal instructions.

Calibration Techniques

Handgun and knapsack sprayer calibration can be done by using the following six steps.

1. Start with a clean sprayer. Mark out an area 1000 ft² (31.62 ft by 31.62 ft).
2. Fill the tank with water. Pump the sprayer to 30 or 40 pounds of pressure. If it does not have a gauge, count the number of strokes used to pump the sprayer.
3. Time the number of **seconds** it takes to spray 1000 ft². Walk the same speed you plan to use when actually spraying.
4. Measure the amount of output in **cups** from the nozzle by collecting water in a container for the same number of seconds it took to spray the square rod.
5. Calculate the gallons per 1000 ft² applied by using the following formula:
6. Adjust and re-calibrate as needed to obtain the desired output.

$$\text{Gal}/1000 \text{ ft}^2 = \text{Amount sprayed (in cups)}/16$$

Example: The calibration process showed 4 cups were applied to the 1000 ft². So $4/16 = .25$ gal/1000 ft².

(You can also multiply gal/1000 ft² x 160 to figure gal/acre)

Another Method

Follow steps 1 – 3 above except measure the amount of water added to the tank in step 2. Then measure the amount of water left in the tank after spraying the square rod. Next, subtract the amount left from the amount originally put in the tank. The difference is the

amount used to spray a square rod. Use the formula in step 5 to determine the GPA. Make sure to measure the volume in cups.

Hose-End Sprayers

Hose-end sprayers use pressure from a water source to distribute the spray. A hose is attached to the lid of the jar and as the water from the hose passes through the spray nozzle, siphon action draws the pesticide from the jar and mixes it at a predetermined rate with the water sprayed out of the nozzle. To obtain more uniform application with hose-end sprayers, the pesticide application rate can be cut in half and the desired area sprayed twice with the second application made at right angles to the first.

Calibration Techniques

The following method can be used to calibrate hose-end sprayers.

1. Mark out an area of 1000 ft².
2. Fill the sprayer jar with a known amount of water, measured in gallons.
3. Measure the amount of water left (in gallons) in the jar after uniformly spraying the 1000 ft² area.
4. Calculate the gallons used per 1000 ft² with the following equation.

Gallons per 1000 ft² = Initial amount – Remaining amount

Maintenance and Cleaning

Manufacturer's instructions for maintenance, lubrication and cleaning of equipment should be followed. The sprayer should be protected from any foreign materials that may clog nozzles and damage sprayer components. Thoroughly clean the sprayer to prevent injury to plants susceptible to damage from a previously applied chemical. Residue removal also helps prolong the life of the equipment and ensures more accurate applications as some pesticides and fertilizers can damage sprayer parts if they remain for extended periods of time.

Cleaning or unclogging a nozzle should be done with a soft bristle brush and water. Using a metal object may damage the nozzle or screen.

The sprayer tank should be cleaned according to the formulation of the pesticide used.

Oil based pesticides, such as esters of 2, 4-D	Wettable powders, amine forms or water-soluble liquids
Flush equipment with water	Flush equipment with water
Rinse sprayer with ammonia solution (1.5 oz or 3 T of household ammonia per 1 ga/water)	Rinse sprayer with detergent solution (.5 oz or 1 T of household detergent per 1 ga/water)
Flush with water	Flush with water

Apply rinsate (liquid from rinsing the sprayer) to the application area or another site listed on the label. Following the final rinse, remove the pump from the sprayer and hang the tank upside down with the spray control valve locked in the open position so that the hose will drain and the tank will dry out. All components of the sprayer should be completely dry before it is reassembled and stored.

Rinsate resulting from triple rinsing empty pesticide containers should be added to the sprayer tank and used as a dilution component for the application.

Proper maintenance and cleaning of application equipment helps prolong the life of equipment and ensure more accurate applications. Cleaning the equipment immediately following the application results in easier and more thorough cleanup since the product is not allowed to dry onto the sprayer components.



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