

Calibrating Single-Nozzle and Boom Sprayers

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B. Bordelon, M. Ellis and R. Weinzierl (eds.) Used with permission.

Calibration is an essential step in the use of any application equipment. For boom sprayers, a satisfactory spray pattern can be achieved only if the output from individual nozzles does not differ more than 10 percent. Owner's manuals for sprayers contain specific instructions for calibration and adjustment. A good time to calibrate is in early spring, right after the sprayer has been reassembled and is being readied for early-season operations. Check for worn disks, and be sure that all nozzle tips have the same angle and capacity rating. The use of wettable powder sprays enlarges nozzle openings, so calibration of each nozzle is essential. Use only clean water when calibrating sprayers. Start the season with a calibrated sprayer, and, depending on the number of gallons sprayed and the cleanliness of the water you have used, calibrate the sprayer again according to intervals specified in the owner's manual (or no later than halfway through the spray season).

To check nozzle uniformity

Follow these steps to check nozzle uniformity:

- Step 1.** Hang a container under each nozzle.
- Step 2.** Operate the sprayer at the usual application pressure until about a pint of water has been collected in each container.
- Step 3.** Measure and record the output of each nozzle. Measurements can be made by a dipstick method, but using a graduated cylinder with indications for fluid ounces or milliliters is better.
- Step 4.** Determine the total output collected from all nozzles.
- Step 5.** Determine the average per nozzle by dividing the total output by the number of nozzles on the boom.
- Step 6.** Multiply the average (Step 5) by 5 percent (0.05).
- Step 7.** Subtract this figure (Step 6) from the average (Step 5). This will give the lower limit of the 10 percent allowable spread.
- Step 8.** Add the 5 percent figure (Step 6) to the average (Step 5). This will give the upper limit of the 10 percent allowable spread.
- Step 9.** The allowable 10 percent spread is between the low figure (Step 7) and the high figure (Step 8).
- Step 10.** Compare the output of each nozzle to these low and high figures.
 - a.** Take apart and clean or replace all nozzles with outputs below the lower limit.
 - b.** Replace all nozzles with outputs greater than the upper limit.
- Step 11.** After cleaning or replacing nozzles, repeat steps 1 through 10 to make sure your repairs have been successful. Output of new nozzles often fails to match the average of existing nozzles.

Spray pattern alignment

Single and double spray patterns can be aligned on a driveway or other flat surface. The edges of a single spray pattern should overlap only very slightly and be offset just enough so that the sprays from adjacent nozzles do not collide. Alignment of nozzles in a double spray or double overlap pattern requires that adjacent nozzle angles be offset slightly so that the area to be treated receives spray from two nozzles, yet the spray patterns do not collide. Remember, a double or overlapping spray pattern will use twice as much spray per acre as a single spray pattern if pump pressure and sprayer speed remain the same. A double spray pattern is most useful for treating dense or tall vegetation.