

Sprayer calibration

The precision application of liquids through a travelling spray boom is a relatively simple concept. Individual spray nozzle tips distribute liquid in a predictable and useable pattern, within a range of pressures. Increased tip pressures result in increased flow rate.

Multiple nozzles may or may not overlap, based on their spacing on the boom, the angle of droplet emergence from each tip, and the spray height (the height of the nozzle tips above the ground). The optimum extent of overlap is determined by the pattern of the nozzle tips.

The average spray rate in volume per area is determined by the combined flow of nozzles, divided by the ground speed, and divided by the width traversed by the boom. Since multiple boom passes typically overlap, the width traversed must be figured as the area unique to an individual boom pass.

Besides the spray tip characteristics available in manufacturer's catalogs, factors which affect spray uniformity include wind, canopy elevation, and equipment condition.

Some questions:

1. What are the characteristics of spray nozzle tips in a catalog?

2. If a nozzle tip has an angle of 110 degrees, and is designed for 30% overlap, and is spaced 12-inches on the boom, what is the optimum height above the target for uniform distribution?

3. If a nozzle tip provides 355, 345, 350, and 355 ml per 30 seconds in separate readings, or for separate tips along the boom, what is the average ounces per minutes per nozzle?

4. How does the observed flow rate per nozzle in the previous example, assuming 40 pounds per square inch pressure, compare with the theoretical catalog value?

5. Why do these values differ?

6. At a ground speed of 3 miles per hour, and nozzle spacing of 12 inches, what is the gallons per acre?

7. How does nozzle height affect spray rate? Anything else?

8. For the previous example, a turf manager wants to apply 16 ounces per acre of Drive 75DF in a 100 gallon spray tank. How many ounces of Drive should be added to the spray tank?

9. What is the spray rate in terms of active ingredient?

10. How much adjuvant should be used?