Pesticide Education Program Fact Sheet

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1/128 Method of Calibration
Calibrating Multiple Nozzle Boom-type Sprayers

Because a gallon = 128 ounces and the test area to be sprayed is 1/128th of an acre, ounces collected = gallons per acre.

This method of sprayer calibration gives sprayer output in gallons per acre when nozzle discharge is measured in ounces over a course length (D) determined from Table 1.

STEP 1.

Adjust the sprayer pressure (30 to 40 psi for most sprayers) and check for uniformity. Operate sprayer for one minute and measure spray from each nozzle. Clean or replace any nozzle tip that delivers 5 percent more or less than the output required for a new nozzle in good working condition.

STEP 2.

Measure the spray band width or nozzle spacing (W) in inches on the boom to determine the course length (D) in feet as shown in column 2 of Table 1. The area to be sprayed must equal 1/128th of an acre. An acre = 43,560 ft^2. Therefore, 1/128th of an acre would equal 43,560 divided by 128 = 340 ft^2. If the nozzle spacing = 20 inches then the distance to travel to equal 1/128th of an acre would be 204 feet. This can be determined by the following formula:

$$\frac{4084}{W \text{ (nozzle spacing in inches)}} = D \text{ (distance in feet)}$$

or

$$\frac{4084}{20 \text{ inches}} = 204 \text{ feet}$$

Or from Table 1. W = 20 inches and D = 204 feet.

STEP 3.

Catch the spray from one nozzle while operating the sprayer under field conditions or for the time required to travel the needed distance at a desired speed. Time required to travel distance (D) at selected speeds is shown in Table 1. Time required for other speeds may be calculated with the following formula:

$$\text{time (seconds)} = \frac{0.682 \times \text{distance (feet)}}{\text{speed (miles per hour)}}$$

STEP 4.

Measure the spray collected in ounces. The number of ounces collected is the same as the number of gallons per acre.

EXAMPLE

You have a sprayer that has 15 nozzles on 30-inch spacings. How would you calibrate it using the 1/128th method?

Using the formula from Step 2 above:

$$\frac{4084}{30 \text{ inches}} = 136 \text{ feet}$$

Or from Table 1. W = 30 inches and D = 136 feet.

Therefore, you would need to time how long it takes for your sprayer to travel 136 feet. Travel this distance several times in the field and get an average time. Perhaps it takes an average of 31 seconds to cover 136 feet.

You would then collect the spray from one nozzle in a container for 31 seconds. Measure the water collected in ounces. The amount collected in ounces equals gallons per acre. If in 31 seconds you collected 20 ounces your sprayer output would be 20 gallons per acre.

Determining how much pesticide to add to the spray mixture

The recommendation from the label is to apply 1 quart of 2,4-D per acre.

The sprayer is applying 20 gallons per acre. Therefore, you will need to add 1 quart of 2,4-D to each 20 gallons of water.

Your sprayer holds 200 gallons. So how much pesticide will you need to add to the 200 gallon spray tank?
200 gallons divided by 20 gallons = 10 quarts of 2,4-D

How large an area can be sprayed by your 200 gallon tank?
200 gallons divided by 20 gallons per acre = 10 acres

Table 1. Distance (D) to travel and seconds required for selected speeds when nozzle coverage is (W) inches so that discharge from one nozzle measured in ounces equals gallons per acre.

W (in)	D (ft)	Seconds to travel (D) feet at a speed of:			
		2 mph	3 mph	4 mph	5 mph
5	817	279	186	139	111
6	681	232	155	116	93
7	583	199	133	99	80
8	510	174	116	87	70
9	454	155	103	77	62
10	408	139	93	70	56
11	371	127	84	63	51
12	340	116	77	58	46
14	292	100	66	50	40
16	255	87	58	43	35
18	227	77	52	39	31
20	204	70	46	35	28
22	186	63	42	32	25
24	170	58	39	29	23
26	157	54	36	27	21
28	146	50	33	25	20
30	136	46	31	23	19
32	128	44	29	22	17
34	120	41	27	20	16
36	113	39	26	19	15
38	107	36	24	18	15
40	102	35	23	17	14