

Sprayer Calibration Tables: Calibration Made Easy

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Soon, harvest will be over. This is the time of year to recalibrate your equipment, including sprayers.

Think about all the money you put through your nozzles. All those herbicides and fungicides add up to a lot of money. And then think about the fact that you don't actually know how much of those expensive products you're applying unless you've calibrated your sprayer. It's a smart business decision that affects your bottom line and weed and disease resistance on your farm. It's time to figure out your actual spray volume and stop assuming your nozzles are perfect.



Figure 1. Think about all the money that goes through this nozzle and then ask yourself, “Do I really know how much this nozzle puts out?” (Credit: M. Mulvaney)

We all hate calibrating, which is why we don't do it as often as we should. This article will make calibration easy and eliminate the math, so at least you won't have math as the reason you've not calibrated. All you want to know is your spray volume, in gallons per acre.

The procedure is really very easy:

1. Set your engine speed under field conditions, and note the RPM. You probably already know that.
2. Set your tank pressure. A good starting point is in the middle of the operating range.
3. Set your ground speed. You probably already know this too.

These numbers are now 'set in stone,' and you'll spray at this RPM, tank pressure, and ground speed under all conditions. Write these values down and post them in the cab.

Now put a can under each nozzle and capture water for 15 seconds. To find your spray volume, use the tables below. Find the table with your ground speed, then find the column with your nozzle spacing. Move down the column until you find the closest value to the amount of water you collected from a single nozzle. Now move left along the row to find the spray volume (GPA).

For example, suppose your running speed is 8 mph with an 18-inch nozzle spacing, with your engine speed and tank pressure set for field application. If you collect 10.0 fl. oz. in 15 seconds from each nozzle, you are running somewhere between 10 and 15 gallons per acre spray volume. To determine a more exact volume, you can extrapolate the GPA in the table (10 fl. oz. is about halfway between 7.8 and 11.6, so you are about halfway between 10 and 15 GPA, or about 12.5 GPA, Table 1). More accurately, we can use Equation 1 below to determine that your spray volume is 12.9 gallons per acre in this example.

Equation 1. Determination of spray volume (gallons per acre, GPA) for a given ground speed (miles per hour, MPH) and nozzle spacing (inches) after collecting a volume of water in 15 seconds from each nozzle.

$$GPA = \frac{(Fl. oz. collected per nozzle in 15 seconds) \times 185.6}{(MPH) \times (nozzle spacing, inches)}$$

Since you're calibrating, you should consider replacing your nozzle tips beforehand. But even if you don't, check for clogged screens and damaged nozzles. The calibration procedure will tell you if one or more nozzles is seriously out of whack, since you'll see that the output volume is significantly lower than the others. Those nozzles obviously need to be checked or replaced.

Now you can spray knowing that you're not wasting money and creating resistance. It's a win-win.

More information on sprayer calibration can be found in EDIS publications:

[Broadcast Boom Sprayer Calibration](#) (Dean & Fishel, 2017)

[Calibration of Herbicide Applicators](#) (Ferrell et al., 2015)

[Boom Sprayer Nozzle Performance Test](#) (Fishel, 2017)

References

Dean, T. W., & Fishel, F. M. (2017). Broadcast Boom Sprayer Calibration. *EDIS*, PI-24, 3. <https://edis.ifas.ufl.edu/pdf/PI/PI01600.pdf>

Ferrell, J. A., Sellers, B. S., & Leon, R. (2015). Calibration of Herbicide Applicators. *EDIS*, SS-AGR-102. <https://edis.ifas.ufl.edu/pdf/WG/WG01300.pdf>

Fishel, F. M. (2017). Boom Sprayer Nozzle Performance Test. *EDIS*, PI-23, 4. <https://edis.ifas.ufl.edu/pi015>

Table 1. Broadcast sprayer calibration chart for common ground speeds, spray volumes, and nozzle spacings. The values are the amount of water to be collected per nozzle in 15 seconds. Values within the box are common for sprayer applications in our region. Print these out and post in your mix-load facility.

Ground speed	GPA	Nozzle spacing (inches)						
		12	15	18	19	20	24	30
----- fl oz/15 seconds -----								
1.0 mph	5	0.3	0.4	0.5	0.5	0.5	0.6	0.8
68.2 sec/100 ft	10	0.6	0.8	1.0	1.0	1.1	1.3	1.6
102.3 sec/150 ft	15	1.0	1.2	1.5	1.5	1.6	1.9	2.4
	20	1.3	1.6	1.9	2.0	2.2	2.6	3.2
	25	1.6	2.0	2.4	2.6	2.7	3.2	4.0
	30	1.9	2.4	2.9	3.1	3.2	3.9	4.8
	35	2.3	2.8	3.4	3.6	3.8	4.5	5.7
	40	2.6	3.2	3.9	4.1	4.3	5.2	6.5
1.5 mph	5	0.5	0.6	0.7	0.8	0.8	1.0	1.2
45.5 sec/100 ft	10	1.0	1.2	1.5	1.5	1.6	1.9	2.4
68.2 sec/150 ft	15	1.5	1.8	2.2	2.3	2.4	2.9	3.6
	20	1.9	2.4	2.9	3.1	3.2	3.9	4.8
	25	2.4	3.0	3.6	3.8	4.0	4.8	6.1
	30	2.9	3.6	4.4	4.6	4.8	5.8	7.3
	35	3.4	4.2	5.1	5.4	5.7	6.8	8.5
	40	3.9	4.8	5.8	6.1	6.5	7.8	9.7
2.0 mph	5	0.6	0.8	1.0	1.0	1.1	1.3	1.6
34.1 sec/100 ft	10	1.3	1.6	1.9	2.0	2.2	2.6	3.2
51.1 sec/150 ft	15	1.9	2.4	2.9	3.1	3.2	3.9	4.8
	20	2.6	3.2	3.9	4.1	4.3	5.2	6.5
	25	3.2	4.0	4.8	5.1	5.4	6.5	8.1
	30	3.9	4.8	5.8	6.1	6.5	7.8	9.7
	35	4.5	5.7	6.8	7.2	7.5	9.0	11.3
	40	5.2	6.5	7.8	8.2	8.6	10.3	12.9
2.5 mph	5	0.8	1.0	1.2	1.3	1.3	1.6	2.0
27.3 sec/100 ft	10	1.6	2.0	2.4	2.6	2.7	3.2	4.0
40.9 sec/150 ft	15	2.4	3.0	3.6	3.8	4.0	4.8	6.1
	20	3.2	4.0	4.8	5.1	5.4	6.5	8.1
	25	4.0	5.0	6.1	6.4	6.7	8.1	10.1
	30	4.8	6.1	7.3	7.7	8.1	9.7	12.1
	35	5.7	7.1	8.5	9.0	9.4	11.3	14.1
	40	6.5	8.1	9.7	10.2	10.8	12.9	16.2

Ground speed	GPA	Nozzle spacing (inches)						
		12	15	18	19	20	24	30
		----- fl oz/15 seconds -----						
3.0 mph	5	1.0	1.2	1.5	1.5	1.6	1.9	2.4
22.7 sec/100 ft	10	1.9	2.4	2.9	3.1	3.2	3.9	4.8
34.1 sec/150 ft	15	2.9	3.6	4.4	4.6	4.8	5.8	7.3
	20	3.9	4.8	5.8	6.1	6.5	7.8	9.7
	25	4.8	6.1	7.3	7.7	8.1	9.7	12.1
	30	5.8	7.3	8.7	9.2	9.7	11.6	14.5
	35	6.8	8.5	10.2	10.7	11.3	13.6	17.0
	40	7.8	9.7	11.6	12.3	12.9	15.5	19.4
3.5 mph	5	1.1	1.4	1.7	1.8	1.9	2.3	2.8
19.5 sec/100 ft	10	2.3	2.8	3.4	3.6	3.8	4.5	5.7
29.2 sec/150 ft	15	3.4	4.2	5.1	5.4	5.7	6.8	8.5
	20	4.5	5.7	6.8	7.2	7.5	9.0	11.3
	25	5.7	7.1	8.5	9.0	9.4	11.3	14.1
	30	6.8	8.5	10.2	10.7	11.3	13.6	17.0
	35	7.9	9.9	11.9	12.5	13.2	15.8	19.8
	40	9.0	11.3	13.6	14.3	15.1	18.1	22.6
4.0 mph	5	1.3	1.6	1.9	2.0	2.2	2.6	3.2
17.0 sec/100 ft	10	2.6	3.2	3.9	4.1	4.3	5.2	6.5
25.6 sec/150 ft	15	3.9	4.8	5.8	6.1	6.5	7.8	9.7
	20	5.2	6.5	7.8	8.2	8.6	10.3	12.9
	25	6.5	8.1	9.7	10.2	10.8	12.9	16.2
	30	7.8	9.7	11.6	12.3	12.9	15.5	19.4
	35	9.0	11.3	13.6	14.3	15.1	18.1	22.6
	40	10.3	12.9	15.5	16.4	17.2	20.7	25.9
4.5 mph	5	1.5	1.8	2.2	2.3	2.4	2.9	3.6
15.2 sec/100 ft	10	2.9	3.6	4.4	4.6	4.8	5.8	7.3
22.7 sec/150 ft	15	4.4	5.5	6.5	6.9	7.3	8.7	10.9
	20	5.8	7.3	8.7	9.2	9.7	11.6	14.5
	25	7.3	9.1	10.9	11.5	12.1	14.5	18.2
	30	8.7	10.9	13.1	13.8	14.5	17.5	21.8
	35	10.2	12.7	15.3	16.1	17.0	20.4	25.5
	40	11.6	14.5	17.5	18.4	19.4	23.3	29.1

Ground speed	GPA	Nozzle spacing (inches)						
		12	15	18	19	20	24	30
		----- fl oz/15 seconds -----						
5.0 mph	5	1.6	2.0	2.4	2.6	2.7	3.2	4.0
13.6 sec/100 ft	10	3.2	4.0	4.8	5.1	5.4	6.5	8.1
20.5 sec/150 ft	15	4.8	6.1	7.3	7.7	8.1	9.7	12.1
	20	6.5	8.1	9.7	10.2	10.8	12.9	16.2
	25	8.1	10.1	12.1	12.8	13.5	16.2	20.2
	30	9.7	12.1	14.5	15.4	16.2	19.4	24.2
	35	11.3	14.1	17.0	17.9	18.9	22.6	28.3
	40	12.9	16.2	19.4	20.5	21.5	25.9	32.3
5.5 mph	5	1.8	2.2	2.7	2.8	3.0	3.6	4.4
12.4 sec/100 ft	10	3.6	4.4	5.3	5.6	5.9	7.1	8.9
18.6 sec/150 ft	15	5.3	6.7	8.0	8.4	8.9	10.7	13.3
	20	7.1	8.9	10.7	11.3	11.9	14.2	17.8
	25	8.9	11.1	13.3	14.1	14.8	17.8	22.2
	30	10.7	13.3	16.0	16.9	17.8	21.3	26.7
	35	12.4	15.6	18.7	19.7	20.7	24.9	31.1
	40	14.2	17.8	21.3	22.5	23.7	28.4	35.6
6.0 mph	5	1.9	2.4	2.9	3.1	3.2	3.9	4.8
11.4 sec/100 ft	10	3.9	4.8	5.8	6.1	6.5	7.8	9.7
17.0 sec/150 ft	15	5.8	7.3	8.7	9.2	9.7	11.6	14.5
	20	7.8	9.7	11.6	12.3	12.9	15.5	19.4
	25	9.7	12.1	14.5	15.4	16.2	19.4	24.2
	30	11.6	14.5	17.5	18.4	19.4	23.3	29.1
	35	13.6	17.0	20.4	21.5	22.6	27.1	33.9
	40	15.5	19.4	23.3	24.6	25.9	31.0	38.8
6.5 mph	5	2.1	2.6	3.2	3.3	3.5	4.2	5.3
10.5 sec/100 ft	10	4.2	5.3	6.3	6.7	7.0	8.4	10.5
15.7 sec/150 ft	15	6.3	7.9	9.5	10.0	10.5	12.6	15.8
	20	8.4	10.5	12.6	13.3	14.0	16.8	21.0
	25	10.5	13.1	15.8	16.6	17.5	21.0	26.3
	30	12.6	15.8	18.9	20.0	21.0	25.2	31.5
	35	14.7	18.4	22.1	23.3	24.5	29.4	36.8
	40	16.8	21.0	25.2	26.6	28.0	33.6	42.0

Ground speed	GPA	Nozzle spacing (inches)						
		12	15	18	19	20	24	30
----- fl oz/15 seconds -----								
7.0 mph	5	2.3	2.8	3.4	3.6	3.8	4.5	5.7
9.7 sec/100 ft	10	4.5	5.7	6.8	7.2	7.5	9.0	11.3
14.6 sec/150 ft	15	6.8	8.5	10.2	10.7	11.3	13.6	17.0
	20	9.0	11.3	13.6	14.3	15.1	18.1	22.6
	25	11.3	14.1	17.0	17.9	18.9	22.6	28.3
	30	13.6	17.0	20.4	21.5	22.6	27.1	33.9
	35	15.8	19.8	23.8	25.1	26.4	31.7	39.6
	40	18.1	22.6	27.1	28.7	30.2	36.2	45.2
7.5 mph	5	2.4	3.0	3.6	3.8	4.0	4.8	6.1
9.1 sec/100 ft	10	4.8	6.1	7.3	7.7	8.1	9.7	12.1
13.6 sec/150 ft	15	7.3	9.1	10.9	11.5	12.1	14.5	18.2
	20	9.7	12.1	14.5	15.4	16.2	19.4	24.2
	25	12.1	15.1	18.2	19.2	20.2	24.2	30.3
	30	14.5	18.2	21.8	23.0	24.2	29.1	36.4
	35	17.0	21.2	25.5	26.9	28.3	33.9	42.4
	40	19.4	24.2	29.1	30.7	32.3	38.8	48.5
8.0 mph	5	2.6	3.2	3.9	4.1	4.3	5.2	6.5
8.5 sec/100 ft	10	5.2	6.5	7.8	8.2	8.6	10.3	12.9
12.8 sec/150 ft	15	7.8	9.7	11.6	12.3	12.9	15.5	19.4
	20	10.3	12.9	15.5	16.4	17.2	20.7	25.9
	25	12.9	16.2	19.4	20.5	21.5	25.9	32.3
	30	15.5	19.4	23.3	24.6	25.9	31.0	38.8
	35	18.1	22.6	27.1	28.7	30.2	36.2	45.2
	40	20.7	25.9	31.0	32.8	34.5	41.4	51.7
8.5 mph	5	2.7	3.4	4.1	4.3	4.6	5.5	6.9
8.0 sec/100 ft	10	5.5	6.9	8.2	8.7	9.2	11.0	13.7
12.0 sec/150 ft	15	8.2	10.3	12.4	13.0	13.7	16.5	20.6
	20	11.0	13.7	16.5	17.4	18.3	22.0	27.5
	25	13.7	17.2	20.6	21.7	22.9	27.5	34.3
	30	16.5	20.6	24.7	26.1	27.5	33.0	41.2
	35	19.2	24.0	28.8	30.4	32.1	38.5	48.1
	40	22.0	27.5	33.0	34.8	36.6	44.0	54.9

Ground speed	GPA	Nozzle spacing (inches)						
		12	15	18	19	20	24	30
		----- fl oz/15 seconds -----						
9.0 mph	5	2.9	3.6	4.4	4.6	4.8	5.8	7.3
7.6 sec/100 ft	10	5.8	7.3	8.7	9.2	9.7	11.6	14.5
11.4 sec/150 ft	15	8.7	10.9	13.1	13.8	14.5	17.5	21.8
	20	11.6	14.5	17.5	18.4	19.4	23.3	29.1
	25	14.5	18.2	21.8	23.0	24.2	29.1	36.4
	30	17.5	21.8	26.2	27.6	29.1	34.9	43.6
	35	20.4	25.5	30.5	32.2	33.9	40.7	50.9
	40	23.3	29.1	34.9	36.8	38.8	46.5	58.2
9.5 mph	5	3.1	3.8	4.6	4.9	5.1	6.1	7.7
7.2 sec/100 ft	10	6.1	7.7	9.2	9.7	10.2	12.3	15.4
10.8 sec/150 ft	15	9.2	11.5	13.8	14.6	15.4	18.4	23.0
	20	12.3	15.4	18.4	19.4	20.5	24.6	30.7
	25	15.4	19.2	23.0	24.3	25.6	30.7	38.4
	30	18.4	23.0	27.6	29.2	30.7	36.8	46.1
	35	21.5	26.9	32.2	34.0	35.8	43.0	53.7
	40	24.6	30.7	36.8	38.9	40.9	49.1	61.4
10.0 mph	5	3.2	4.0	4.8	5.1	5.4	6.5	8.1
6.8 sec/100 ft	10	6.5	8.1	9.7	10.2	10.8	12.9	16.2
10.2 sec/150 ft	15	9.7	12.1	14.5	15.4	16.2	19.4	24.2
	20	12.9	16.2	19.4	20.5	21.5	25.9	32.3
	25	16.2	20.2	24.2	25.6	26.9	32.3	40.4
	30	19.4	24.2	29.1	30.7	32.3	38.8	48.5
	35	22.6	28.3	33.9	35.8	37.7	45.2	56.6
	40	25.9	32.3	38.8	40.9	43.1	51.7	64.6
10.5 mph	5	3.4	4.2	5.1	5.4	5.7	6.8	8.5
6.5 sec/100 ft	10	6.8	8.5	10.2	10.7	11.3	13.6	17.0
9.7 sec/150 ft	15	10.2	12.7	15.3	16.1	17.0	20.4	25.5
	20	13.6	17.0	20.4	21.5	22.6	27.1	33.9
	25	17.0	21.2	25.5	26.9	28.3	33.9	42.4
	30	20.4	25.5	30.5	32.2	33.9	40.7	50.9
	35	23.8	29.7	35.6	37.6	39.6	47.5	59.4
	40	27.1	33.9	40.7	43.0	45.2	54.3	67.9

Ground speed	GPA	Nozzle spacing (inches)						
		12	15	18	19	20	24	30
		----- fl oz/15 seconds -----						
11.0 mph	5	3.6	4.4	5.3	5.6	5.9	7.1	8.9
6.2 sec/100 ft	10	7.1	8.9	10.7	11.3	11.9	14.2	17.8
9.3 sec/150 ft	15	10.7	13.3	16.0	16.9	17.8	21.3	26.7
	20	14.2	17.8	21.3	22.5	23.7	28.4	35.6
	25	17.8	22.2	26.7	28.1	29.6	35.6	44.4
	30	21.3	26.7	32.0	33.8	35.6	42.7	53.3
	35	24.9	31.1	37.3	39.4	41.5	49.8	62.2
	40	28.4	35.6	42.7	45.0	47.4	56.9	71.1
11.5 mph	5	3.7	4.6	5.6	5.9	6.2	7.4	9.3
5.9 sec/100 ft	10	7.4	9.3	11.2	11.8	12.4	14.9	18.6
8.9 sec/150 ft	15	11.2	13.9	16.7	17.7	18.6	22.3	27.9
	20	14.9	18.6	22.3	23.5	24.8	29.7	37.2
	25	18.6	23.2	27.9	29.4	31.0	37.2	46.5
	30	22.3	27.9	33.5	35.3	37.2	44.6	55.8
	35	26.0	32.5	39.0	41.2	43.4	52.0	65.0
	40	29.7	37.2	44.6	47.1	49.6	59.5	74.3
12.0 mph	5	3.9	4.8	5.8	6.1	6.5	7.8	9.7
5.7 sec/100 ft	10	7.8	9.7	11.6	12.3	12.9	15.5	19.4
8.5 sec/150 ft	15	11.6	14.5	17.5	18.4	19.4	23.3	29.1
	20	15.5	19.4	23.3	24.6	25.9	31.0	38.8
	25	19.4	24.2	29.1	30.7	32.3	38.8	48.5
	30	23.3	29.1	34.9	36.8	38.8	46.5	58.2
	35	27.1	33.9	40.7	43.0	45.2	54.3	67.9
	40	31.0	38.8	46.5	49.1	51.7	62.1	77.6
12.5 mph	5	4.0	5.0	6.1	6.4	6.7	8.1	10.1
5.5 sec/100 ft	10	8.1	10.1	12.1	12.8	13.5	16.2	20.2
8.2 sec/150 ft	15	12.1	15.1	18.2	19.2	20.2	24.2	30.3
	20	16.2	20.2	24.2	25.6	26.9	32.3	40.4
	25	20.2	25.2	30.3	32.0	33.7	40.4	50.5
	30	24.2	30.3	36.4	38.4	40.4	48.5	60.6
	35	28.3	35.3	42.4	44.8	47.1	56.6	70.7
	40	32.3	40.4	48.5	51.2	53.9	64.6	80.8

Ground speed	GPA	Nozzle spacing (inches)						
		12	15	18	19	20	24	30
		----- fl oz/15 seconds -----						
13.0 mph	5	4.2	5.3	6.3	6.7	7.0	8.4	10.5
5.2 sec/100 ft	10	8.4	10.5	12.6	13.3	14.0	16.8	21.0
7.9 sec/150 ft	15	12.6	15.8	18.9	20.0	21.0	25.2	31.5
	20	16.8	21.0	25.2	26.6	28.0	33.6	42.0
	25	21.0	26.3	31.5	33.3	35.0	42.0	52.5
	30	25.2	31.5	37.8	39.9	42.0	50.4	63.0
	35	29.4	36.8	44.1	46.6	49.0	58.8	73.5
	40	33.6	42.0	50.4	53.2	56.0	67.2	84.0
13.5 mph	5	4.4	5.5	6.5	6.9	7.3	8.7	10.9
5.1 sec/100 ft	10	8.7	10.9	13.1	13.8	14.5	17.5	21.8
7.6 sec/150 ft	15	13.1	16.4	19.6	20.7	21.8	26.2	32.7
	20	17.5	21.8	26.2	27.6	29.1	34.9	43.6
	25	21.8	27.3	32.7	34.5	36.4	43.6	54.5
	30	26.2	32.7	39.3	41.5	43.6	52.4	65.4
	35	30.5	38.2	45.8	48.4	50.9	61.1	76.4
	40	34.9	43.6	52.4	55.3	58.2	69.8	87.3
14.0 mph	5	4.5	5.7	6.8	7.2	7.5	9.0	11.3
4.9 sec/100 ft	10	9.0	11.3	13.6	14.3	15.1	18.1	22.6
7.3 sec/150 ft	15	13.6	17.0	20.4	21.5	22.6	27.1	33.9
	20	18.1	22.6	27.1	28.7	30.2	36.2	45.2
	25	22.6	28.3	33.9	35.8	37.7	45.2	56.6
	30	27.1	33.9	40.7	43.0	45.2	54.3	67.9
	35	31.7	39.6	47.5	50.1	52.8	63.3	79.2
	40	36.2	45.2	54.3	57.3	60.3	72.4	90.5
14.5 mph	5	4.7	5.9	7.0	7.4	7.8	9.4	11.7
4.7 sec/100 ft	10	9.4	11.7	14.1	14.8	15.6	18.7	23.4
7.1 sec/150 ft	15	14.1	17.6	21.1	22.3	23.4	28.1	35.1
	20	18.7	23.4	28.1	29.7	31.2	37.5	46.9
	25	23.4	29.3	35.1	37.1	39.1	46.9	58.6
	30	28.1	35.1	42.2	44.5	46.9	56.2	70.3
	35	32.8	41.0	49.2	51.9	54.7	65.6	82.0
	40	37.5	46.9	56.2	59.4	62.5	75.0	93.7

Ground speed	GPA	Nozzle spacing (inches)						
		12	15	18	19	20	24	30
		----- fl oz/15 seconds -----						
15.0 mph	5	4.8	6.1	7.3	7.7	8.1	9.7	12.1
4.5 sec/100 ft	10	9.7	12.1	14.5	15.4	16.2	19.4	24.2
6.8 sec/150 ft	15	14.5	18.2	21.8	23.0	24.2	29.1	36.4
	20	19.4	24.2	29.1	30.7	32.3	38.8	48.5
	25	24.2	30.3	36.4	38.4	40.4	48.5	60.6
	30	29.1	36.4	43.6	46.1	48.5	58.2	72.7
	35	33.9	42.4	50.9	53.7	56.6	67.9	84.8
	40	38.8	48.5	58.2	61.4	64.6	77.6	97.0