Sprayer Calibration Worksheet

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Checking Speed

To check speed, mark two points from 200 to 800 feet apart. It is best to do this in field conditions as that can have an effect on sprayer speed. Use greater distances for faster speeds. With a 1/2 loaded sprayer, time the drive in seconds from one mark to the other, then turn around and go back. Take the average of the two speeds using the equation below to calculate speed.

Run time 1: ____ seconds   Run time 2: ____ seconds

Average time: (Time 1) _____ + (Time 2) ____ / 2 = _____ seconds

Speed (MPH) = (distance in feet) _______ / (time in seconds) ________ x .68

Speed (MPH) = ________

Checking Spray Rate

The next step is to calculate the “desired spray rate” or gallons per minute (GPM). This number will be used to select the correct nozzle size for the application and determine the amount we have to collect from each nozzle. In order to calculate this you will need to know the nozzle spacing in inches (W), the speed of the sprayer (calculated above), and the gallons per acre (GPA) that is required by the label for the application. Use the formula below to determine how much the nozzles should be putting out.

$$\frac{\text{(MPH)}\ \_\_\_\_\_ \times \text{(W)}\ \_\_\_\_\_ \times \text{(GPA)}\ \_\_\_\_\_}{5{,}940} = \_\_\_\_\_\_\_ \text{ gallons per minute (GPM)}$$

With the desired spray rate calculated, the next step to measure the actual spray rate. To do this use a graduated catch container and collect from each nozzle. Most containers are labeled in ounces. Use the formula below to convert GPM to ounce per minute.

GPM _____ x 128 ounces/gallon = _____ ounces per minute

Now convert minutes to seconds. This is done to make the catching time more manageable. Use the formula below using the ounces per minute calculated above.

Ounces per minute _____ / 60 seconds = ____ ounces per second

Now multiply the ounces per second with the number of seconds that you wish to collect from each nozzle. Typically a 15 to 20 second time is used, but you can collect for longer if you prefer.

Ounces per second ____ x time in seconds _____ = _____ ounces needed to collect

Checking Spray Rate Use the chart below to write down the ounces per second collected. If nozzles are off by ±5% then additional steps need to be taken to correct the spray rate.

To calculate 5% error, use the below formula using the ounces per time in seconds calculated above:

Ounce per time in seconds ______ x .05 = _____ 5% error
Ounces 5% above = ____ ounces per time in seconds + ____ 5% error = ____ upper limit
Ounces 5% below = ____ ounces per time in seconds - ____ 5% error = ____ lower limit

Nozzle	Ounces/time in seconds	Within 5% (Y/N)	Nozzle	Ounces/time in seconds	Within 5% (Y/N)
1			37		
2			38		
3			39		
4			40		
5			41		
6			42		
7			43		
8			44		
9			45		
10			46		
11			47		
12			48		
13			49		
14			50		
15			51		
16			52		
17			53		
18			54		
19			55		
20			56		
21			57		
22			58		
23			59		
24			60		
25			61		
26			62		
27			63		
28			64		
29			65		
30			66		
31			67		
32			68		
33			69		
34			70		
35			71		
36			72		

Correct the Spray Rate

If a couple nozzles are off by more than 5%, check the nozzles to determine if the nozzle is blocked or is worn out. Clean out or replace the nozzle as necessary. This also lets you check for a uniform output from your nozzles.

If all the nozzles are off by 5% then the following steps can be taken:

1. Change the nozzles to match desired gallons per minute.
2. Adjust your speed. Increasing your speed decreases your spray rate and decreasing your speed increases your spray rate.

   First determine convert ounces per second back to gallons per minute (GPM)

   Ounces per time in seconds _____
   --- = _____ ounces per second
   Time collected in seconds _____

   ounces per second ____ / 128 x 60 = ____ gallons per minute (GPM)

   Use the GPM calculated above to calculate the MPH needed

   (GPM) ______ x 5,940
   ---------------------------------- = ____ MPH
   (GPA) ______ x (W) ______

   This is the new speed that will need to maintain the GPA required by the label.

3. If your nozzles are uniformly putting out and you want to find out what GPA you are actually putting out use the formula below. If this GPA is ***still within the ranges specified on the label*** you may not have to make adjustments***.*** To determine the new GPA use the formula below.

   First determine convert ounces per second back to gallons per minute (GPM) using the process above. Then use the GPM in the formula below to calucate the new gallons per acre (GPA)

   (GPM) _____ x 5,940
   -------------------------------- = ____ gallons per acre (GPA)
   (MPH) _____ x (W) ____

   This is the new gallons per acre that you will be spraying.

   REMEMBER THAT THIS CAN ONLY BE USED IF IT IS WITHIN THE RANGES SPECIFIED ON THE LABEL! ALSO REMEMBER, IF YOU GO WITH THE NEW GPA THE AMOUNT OF PESTICIDE GOING INTO THE TANK WILL CHANGE DEPENDENT ON THE NEW GPA.

 (Updated February 2020)