THE UNIVERSITY OF GEORGIA
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Calibration Method for Sprayers and Other Liquid Applicators

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The procedure below is based on spraying 1/128 of an acre per nozzle or row spacing and collecting the spray that would be released during the time it takes to spray the area. Because there are 128 ounces of liquid in 1 gallon, this convenient relationship results in ounces of liquid collected being directly equal to the application rate in gallons per acre.

Calibrate with clean water when applying toxic pesticides mixed with large volumes of water. Check uniformity of nozzle output across the boom. Collect from each for a known time period. Each nozzle should be within 10 percent of the average output. Replace with new nozzles if necessary. When applying materials that are appreciably different from water in weight or flow characteristics -- such as fertilizer solutions, etc. -- calibrate with the material to be applied. Exercise extreme care and use protective equipment when active ingredient is involved.

Step 1. Determine type of application to be made and select appropriate procedure from Table 1. *Example:* Herbicide Broadcast, Procedure A.

Table 1. Corresponding procedures for different spray applications

Type of Application	Procedure	Coverage Basis
Herbicide, Insecticide, Nematicide, Fungicide or Liquid Fertilizer		
Broadcast	A	Broadcast (gal/acre)
Band	B	Broadcast (gal/acre of band)
Row	C	Row (gal/acre of row)

Note: Determine and use average row spacing for modified row patterns. Use width of area covered per row as row spacing in skip row patterns.

Step 2. Using procedure A, B or C below as selected in Step 1, determine appropriate calibration distance from Table 2.

(A) Broadcast Application: Outlets or nozzles must be evenly spaced. Measure outlet (nozzle, etc.) spacing. Find this spacing in left column of Table 2 and read the corresponding calibration distance. *Example:* For a 19-inch spacing, the distance would be 214.9 feet.

(B) Band Application: Measure band width. Find this band width in the left column of Table 2 and read the corresponding calibration distance. *Example:* For a 12-inch band, the distance would be 340.3.

(C) Row Application: Measure row spacing for evenly spaced rows. Find this row spacing in the left column of Table 2 and read the corresponding calibration distance from the column on the

right. *Example:* For a 38-inch row spacing, the distance would be 107.5 feet. (See note above for modified and skip rows.)

Step 3. Measure and mark calibration distance in a **typical** portion of the field to be sprayed.

Step 4. With all attachments in operation (harrows, planters, etc.) and traveling at the desired operating speed, determine the number of seconds it takes to travel calibration distance. Be sure machinery is traveling at full operating speed the full length of the calibration distance. Mark or make note of engine RPM and gear. **Machine must be operated at same speed for calibration.**

Step 5. With sprayer sitting still and operating at same throttle setting or **engine RPM** as used in Step 4, adjust pressure to the desired setting. **Machine must be operated at same pressure used for calibration.**

Step 6. For procedure (A), Step 2, broadcast application -- Collect spray from **one** nozzle or outlet for the number of seconds required to travel the calibration distance.

For procedure (B), Step 2, band application -- Collect spray from **all** nozzles or outlets used on one band width for the number of seconds required to travel the calibration distance.

For procedure (B), Step 2, row application -- Collect spray from **all** outlets (nozzles, etc.) used for one row for the number of seconds required to travel the calibration distance.

Step 7. Measure the amount of liquid collect in fluid ounces. **The number of ounces collected is the gallons per acre rate** on the coverage basis indicated in Table 1. For example, if you collect 18 ounces, the sprayer will apply 18 gallons per acre. Adjust applicator speed, pressure, nozzle size, etc., to obtain recommended rate. If speed is adjusted, start at Step 4 and recalibrate. If pressure or nozzles are changed, start at Step 5 and recalibrate.

CAUTION: Agricultural Chemicals can be dangerous. Improper selection or use can seriously injure people, animals, plants, soil or other property. Be Safe: Select the right chemical for the job. Handle it with care. Follow instructions on the container label and from the equipment manufacturer.

Table 2. Calibration distances with corresponding widths.

Row Spacing, Outlet Spacing or Band Width (whichever applies) (inches)	Calibration Distance (feet)	Row Spacing, Outlet Spacing or Band Width (whichever applies) (inches)	Calibration Distance (feet)
48**	85.1	24	170.2
46	88.8	20	204.2
44	92.8	19	214.9
42	97.2	18	226.9
40	102.1	14	291.7
38	107.5	12	340.3
36	113.4	10	408.4
32	127.6	8	510.5
30	136.1		

To determine distance for spacing or band width not listed, divide the spacing or band width expressed in feet into 340.3. *Example:* For a 13" band, the calibration distance would be 340 divided by 13/12 = 314.1.

** To increase calibration accuracy for a wide nozzle spacing, multiply calibration distance by a factor (for example, 2); then divide the fluid amount collected by the same factor for GPA. For narrow nozzle spacings with long calibration distances, divide calibration distance by a

factor (for example, 4); then multiply the fluid amount collected by the same factor for GPA.

Step 8. To determine amount of pesticide to put into a sprayer or applicator tank, divide the total number of gallons of mixture to be made (tank capacity for a full tank) by the gallons per acre rate from Step 7 and use recommended amount of pesticide for this number of acres.

Band Application

Use the recommended broadcast pesticide rates to make tank mixtures for band applications when calibrating with procedure (B) of this method. The number of gallons/acre determined in Step 7 are the gallons that will be applied to each acre of actually treated band.

To determine the gallons of spray mixture required to make a band application on a field, the number of acres that will be in the actually treated band must be determined. When all treated bands are the same width and all untreated bands are the same width, which is usually the case, the acres in the actually treated band can be calculated by placing the width of the treated band over the sum of the widths of the treated band and the untreated band, and multiplying this fraction times the number of acres in the field. *Example:* How many acres will actually be treated in a 30-acre field if a 12-inch band of chemical is applied over the drill of rows spaced 36 inches apart. The treated band width is 12 inches. The untreated band width is (36"-12") = 24 inches. Acres actually treated will be 12 inches divided by (12" + 24") times 30 acres = 10 acres. The amount of mixture required will be 10 times the number of gallons per acre form Step 7. The amount of chemical required will be 10 times the recommended broadcast rate for 1 acre.

Check rate recommendations carefully as to type of application, broadcast, band or row, and type of material specified, formulated product, active ingredient, etc.

Calculating Formulation Requirements for Active Ingredient Rates

To determine amount of liquid pesticide required for a rate given in pounds of active ingredient per acre, divide recommended rate by pounds active ingredient per gallon stated on label. *Example:* Pesticide label states 4 lbs. active ingredient per gal. and recommends ½ lb. active ingredient per acre. Amount of pesticide required - ½ lb/A divided by 4 lb/gal = gal/A.

To determine amount of wettable powder required for a rate given in pounds active ingredient per acre, divide recommended rate by percent active ingredient stated on label. *Example:* Pesticide label states powder is 50 percent active ingredient. Two pounds of active ingredient are recommended per acre. Amount of pesticide powder required - 2 lbs AI/A divided by 0.5 AI/lb = 4 lbs/A.

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