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GRANULAR APPLICATOR CALIBRATION PROCEDURE

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Applicators used in granular applications should be calibrated to ensure uniformity and accuracy. An accurate and uniform application can reduce the quantity of an active ingredient required for a given degree of control, benefiting the environment as well as the producer.

Several factors influence the amount of granular material applied to a given area. Granular material is usually metered with an adjustable orifice (outlet). The amount of material that flows through the orifice per revolution depends on the orifice opening size and on rotor speed. A wide variation in product characteristics, such as size, density and shape, requires recalibration for every chemical applied. Climatic condition changes such as temperature and humidity can also result in different flow rates.

CAUTION: Calibration is done using the chemical to be applied. Protective equipment such as rubber gloves should be used during calibration to avoid contact with chemicals.

Granular application is usually done in combination with another operation, such as planting or cultivating. The applicator may be ground-driven or driven with a small electric motor. The following procedure will give the indicated pounds (total weight) of material applied per acre broadcast. This procedure requires a weight scale incremented in ounces. Scales should be accurate within ¼ ounce to obtain a high degree of accuracy.

STEP 1. Determine the type of application to be made and select the appropriate procedure from Table 1.

TABLE 1.

Type of Application	Procedure	Coverage Basis
Broadcast	A	Broadcast (lbs/acre)
Band	B	Broadcast (lbs/acre of band)
Row*	C	Row (lbs/acre of row)

*Determine and use average row spacing for modified row patterns. Use width of area covered per row as row spacing in skip row patterns for broadcast rates.

STEP 2. Using procedure A, B or C below (as selected in Step 1), use Table 2 to determine the appropriate calibration distance.

(A) Broadcast application: Measure outlet spacing. Outlets must be evenly spaced. Find this spacing in the left column of Table 2 and read across for the corresponding calibration distance.

EXAMPLE: For a 19-inch spacing, the calibration distance is 214.9 feet.

(B) Band application: Measure band width. Find this band width in the left column of Table 2 and read across for the corresponding calibration distance.

EXAMPLE: For a 12-inch band, the calibration distance is 340.3 feet.

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

EXAMPLE: For a 38-inch row spacing, the calibration distance is 107.5 feet.

TABLE 2. Calibration distances with corresponding widths.

Row Spacing, Outlet Spacing or Band Width (Whichever Applies) (Inches)	Calibration Distance (Feet)
48*	85.1
42	97.2
40	102.1
38	107.5
36	113.4
30	136.1
24	170.2
20	204.2
19	214.9
18	226.9
12	340.3
10	408.4
8	510.5

*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-inch band, the calibration distance would be 340.3 divided by 13/12 = 314.1.

NOTE: To increase calibration accuracy for wide outlet spacing, multiply calibration distance by a factor (for example, 2); then, divide the material collected (see Step 8) by the same factor (in this case, 2) for pounds per acre. For narrow spacing with long calibration distances, divide calibration distance by a factor (for example, 4); then, multiply the material collected (see Step 8) by the same factor (in this case, 4) for pounds per acre. Application accuracy will decrease when factoring narrow outlet or band spacing.

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

STEP 3. Measure and mark calibration distance in a typical portion of the field to which chemicals will be applied.

STEP 4. With all attachments (such as harrows or planters) in operation and traveling at the desired operating speed, determine the number of seconds it takes to travel the 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. The machine must be operated at the same speed as for calibration.

STEP 5. Multiply the number of seconds required to travel the calibration distance by 8. This is the number of seconds to collect.

STEP 6. With the applicator sitting still and operating at same engine RPM speed as used in Step 4, adjust gate openings to the desired setting. Check uniformity of outlets across the swath or rows. Collect from each outlet for an equal, known time period. Each outlet should be within 5 percent of the average outlet output.

STEP 7. ** For procedure **(A)** of Step 2, collect from one outlet for the number of seconds indicated in Step 5.

For procedure **(B)** of Step 2, collect from all outlets used on one band width for the number of seconds indicated in Step 5.

For procedure **(C)** of Step 2, collect from all outlets used for one row for the number of seconds indicated in Step 5.

**For ground-driven equipment, multiply the calibration distance by 8 and collect from each outlet while traveling the calibration distance.

STEP 8. Weigh the amount of material collected in ounces. The number of ounces collected is the pounds-per-acre rate on the coverage basis indicated in Table 1. For example, if you collect 18 ounces, the applicator will apply 18 pounds per acre broadcast. Adjust applicator speed and gate opening to obtain the recommended rate.

STEP 9. Check applicators for proper calibration every four to eight hours of use by repeating steps 7 and 8. If there is a difference of more than 5 percent of the original calibration, check the system.

CALCULATING THE AMOUNT OF PRODUCT NEEDED FOR BAND APPLICATION

To determine the pounds of material required to make a band application on a field, determine the number of acres in the actual treated band. When all treated bands are the same width and all untreated bands are the same width, which is usually the case, calculate the acres in the treated band by dividing the width of the treated band by the sum of the widths of the treated and untreated bands, then multiply this fraction by the number of acres in the field.

EXAMPLE: How many acres will 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 and the untreated band width is 24 inches (36 inches – 12 inches) = 24 inches. Treated acres will equal 12 inches divided by (12 inches + 24 inches) multiplied by 30 acres, which equals 10 acres. The amount of material required for the 30-acre field will be 10 times the number of pounds per acre from Step 8.

SUMMARY

Humidity affects both the application rate and caking in the metering rolls. Rechecking the acreage a bag of granular material covers is extremely important. Check hoses and outlets at each fill-up and look for any obstructions that might restrict the particle flow through them. Other calibration methods using manufacturers' calibration cups are also accurate; the procedure is usually written on the cup. **Be sure you use a cup specifically designed for the particular material being applied.**

Most granular materials are caustic to metals; therefore, you increase the life of these applicator units with proper care. Before storing the unit, clean it thoroughly. A film of 50/50 mixture of diesel fuel and used oil sprayed or brushed on all metal parts slows rust development. Remove and store inside any plastic, fiberglass or rubber parts exposed to sunlight. The sun's rays break down these compounds and cause them to become hard and brittle.

Always handle pesticides with care and according to label recommendations. When misused or misapplied, they can be deadly.

Learning for Life

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