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Sprayer Calibration—Granule Applicators

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Some pesticides are applied as granules with granule applicators. These granular pesticides are usually applied to the soil. Most granules used for row crops are applied with either a band applicator or a broadcast applicator. Granules are prediluted with a fixed amount of pesticide; so there is no need for mixing.

Granule applicators are sensitive to speed; so try to maintain a uniform travel speed, as when spraying. Wind can greatly affect the distribution from granule applicators. Keep the distributors adjusted so that the granules will be deposited uniformly. Empty the granule hoppers each day because moisture affects the metering of granules.

Granule application rates are affected by the following:

- Orifice size (feeder-gate setting)
- Ground speed
- Agitator speed
- Size and nature of granules
- Roughness of the ground
- Humidity
- Temperature.

This Guide describes the procedures for calibrating broadcast and band applicators.

CALIBRATION—BAND APPLICATORS

Step 1. Determine application rate. *Read the label and the operators manual!* The recommended range of application rates is on the label. Be sure the rate you use is the right one for your soil and crop conditions. Normally the label will list the total amount of pesticide granules (product) to apply per acre. For example: Apply 40 pounds of product per acre.

The recommended rate may also be expressed in pounds (lb) of *active ingredient*. If so, you will need to go to Step 2. If the rate is for *total product* per acre, then skip Steps 2 and 3 and go to Step 4.

Step 2. Determine concentration of active ingredient. *Read the label!* The label will show the active ingredient in each container in percentage.

Example: Contains 5% 2,4-D.

Step 3. Calculate how much pesticide to apply. If the label expresses the application rate (AR) as pounds of active ingredient per acre, then the amount of total product per acre is calculated as follows:

$$\text{Lb of pesticide product/acre} = \frac{\text{AR} \times 100}{\text{Concentration (percent)}}$$

Example: You want to apply 2 lb of active ingredient of 2,4-D per acre, and the label shows that the concentration of the product is 5 percent 2,4-D.

$$\text{Lb of 2,4-D product/acre} = \frac{2 \times 100}{5} = 40$$

Therefore, you will have to apply 40 lb of total product per acre to get 2 lb of 2,4-D per acre.

Step 4. Calculate amount of pesticide to apply per course.

CAUTION!

Sometimes the application rate is based on the total crop acreage, and at other times it is based on the area covered by the bands only.

First, consider the rate based on *band area only*. You know the application rate you want. (Example: 40 lb/acre) You need to calculate how much pesticide should be collected when you have traveled a given distance. Use a distance of 653 feet (about 1/8 mile) because 653 makes the calculations easy and will result in an accurate calibration. The following equation is the weight in ounces (oz) for each applicator.

$$\text{Oz} = \frac{\text{Rate (lb/acre)} \times \text{Width (inches)}}{50}$$

Example: You want to apply 40 lb of 2,4-D granules per acre on a band that is 15 inches wide.

$$\text{Oz} = \frac{40 \times 15}{50} = 12$$

Adjust the applicator used in this example until it applies within plus or minus 5 percent of 12 oz. (11 to 13 oz.) on the 653-foot band.

Now consider the rate based on *total crop acreage*. Use the same equation, *but use row spacing* instead of band area.

Example: You want to apply 40 lb of 2,4-D granules per crop acre, and the row spacing is 30 inches.

$$\text{Oz} = \frac{40 \times 30}{50} = 24$$

Adjust the applicator until it applies within plus or minus 5 percent of 24 oz for the 653-ft course.

Step 5. Adjust applicator. *Read the instruction manual!*

The instruction manual should be used as a guide for the initial setting. Open and close the metering gate several times to be sure it is operating properly. Move the gate lever from the closed position to the initial setting so slack will always be taken up in the same direction each time you change settings.

Step 6. Add pesticide to hopper. *Read the label!* Observe handling instructions before opening pesticide container. Wear appropriate protective equipment and clothing. Add pesticide to hopper until it is one-half full.

Step 7. Operate applicators. Turn on the applicators, and while they are operating check to see that all are feeding pesticide.

Step 8. Disconnect feed tubes. Turn off applicators and disconnect each feed tube from the hopper.

Step 9. Attach container to hopper. Attach a container such as a paper or plastic bag to the hopper opening(s).

Step 10. Travel a measured distance. Lay out the 653-foot (1/4-mile) course in the field. Travel that distance at the speed you will use during application.

Step 11. Weigh pesticide collected. Weigh and record the amount collected from each applicator. The weight will often be less than a pound; so a small scale such as a postal scale is needed. Adjust the applicator gate opening until the applicator applies within plus or minus 5 percent of the weight calculated in Step 4.

CALIBRATION—BROADCAST APPLICATORS

Note: Steps 1 through 3, same as for band applicators.

Step 4. Calculate how much pesticide to apply per area.

$$\text{Lb of pesticide} = \text{Lb/acre} \times \text{Area.}$$

The area covered in acres can be calculated by the following equation:

$$\text{Area (acres)} = \frac{\text{Width (feet)} \times \text{Length (feet)}}{43,560}$$

Example: You are calibrating a 10-foot applicator, using an area 20 feet wide by 240 feet long. You want to apply 40 lb of product per acre.

$$\text{Area} = \frac{20 \times 240}{43,560} = 0.11 \text{ acres}$$

$$\text{Pounds} = 40 \times 0.11 = 4.4 \text{ lb}$$

Therefore you want to keep adjusting the spreader until it applies within plus or minus 5 percent of 4.4 lb on the 20-by-240-foot area.

Step 5. Adjust applicator. *Read the instruction manual!*

The instruction manual should be used as a guide for the initial setting. Open and close the metering gate several times to be sure it is operating properly. Move the gate lever from the closed position to the initial setting so slack is always taken up in the same direction each time you change settings.

Step 6. Pour granules into hopper. Pour until the hopper is filled to a mark you have made on hopper side with a pencil or other ink marker. The mark should be at least one-third of the distance from the bottom of hopper to the top.

Step 7. Apply pesticide to predetermined acreage. Apply pesticide to the predetermined area in your field. Drive at the speed you want to use during application.

Step 8. Refill hopper to mark. Weigh the container with unused pesticide. Pour more pesticide into the hopper until the level again reaches the mark on the side of the hopper. Then reweigh the container and pesticide. Subtract the two weights to determine the amount applied in Step 7. Compare this amount with the amount calculated in Step 4. If the amount is within plus or minus 5 percent, the applicator is calibrated. If the amount is not within 5 percent, readjust metering gate and start again with Step 6.