

Granular Application Equipment Calibration



Calibration

Calibration is the process used to determine the application rate of pesticide or fertilizer application equipment. Calibration helps to ensure the proper amount of product is applied. It is the key to successful pesticide and fertilizer use. Failure to calibrate equipment can result in ineffective applications. Applying too much is costly, unlawful and can injure non-target sites, animals and people. Applying too little can result in poor control of the targeted pest, may contribute to pesticide resistance and can make re-treatment necessary.

It is important to calibrate equipment on a regular basis to compensate for variations. The equipment may become worn or damaged with use and result in inaccurate output and spray pattern.

Drop vs Rotary Spreaders

Granular fertilizers and pesticides are usually applied to lawns and small areas with drop (gravity) or rotary (centrifugal) spreaders. Drop spreaders generally produce more accurate applications and patterns. The edge of the drop spreader pattern is distinct so any variations in steering will result in missed or overlapping strips. Drop spreaders create less chance of drift and better control of the product since the granules drop straight down onto the application surface. The drawbacks are that some drop spreaders will not handle large granules and wet turf can create a problem due to minimal ground clearance.

Rotary spreaders produce less uniform distribution but they have a wide swath that allows faster coverage of the area. Because the edge of the pattern is feathered, variations in steering during applications are less significant. Drifting can be a problem when using fine granules, but rotary spreaders are better suited to handle large granules. The application rate

and width of the swath can be cut in half to obtain a more uniform rate with rotary spreaders.

Product Label

Choose a product according to the suitable active ingredient, formulation, target pests, and sites where it can be used. Before applying product, read the label to ensure proper procedures and application rates are followed. Most product labels give the recommended application per 1000 ft². The spreader manual and/or label will usually indicate proper settings for various application rates. However, calibration still needs to be performed to ensure the settings are accurate and to compensate for wear and variations in equipment. The label also contains specific product information, required protective clothing, use, storage and disposal instructions and other precautions and restrictions that you are legally obligated to follow.

Making Applications

When making granular applications, a header strip (at least two widths of the spreader pattern) should be left at both ends of the treated area. This strip should be large enough to provide an area to turn around, realign the spreader, and resume the traveling speed used for application. Close the spreader when entering the header strip and open it again when moving back into



the application area. The header should be treated last.

It is essential to maintain a constant walking speed when making applications with a drop or rotary spreader to obtain uniform and accurate distribution. With these spreaders, a change in

application speed is not proportional to the rate of product flow.

Due to the number of variables introduced by both the operator and the product, the application rate of the spreader should be checked with the operator and product to be used each time an application is made.

Calibration Techniques

Calibration of drop or rotary spreaders can be accomplished by using the following method:

1. Start with a clean sprayer. Mark out an area 100 ft². If marked on a clean concrete or asphalt surface, the product can be swept up and reused once calibration is complete.
2. Weigh and record the amount of product you think will cover 100 ft² and add it to the hopper. Adjust the spreader to a setting you feel is close to the desired rate. Refer to the applicator manual.
3. Apply granules to the marked area, walking the same rate you plan to use during treatment.
4. Calculate the amount of product discharged by weighing the product left in the hopper. Then use the following equation to determine the amount of product used per 1000 ft².

$$\begin{aligned} \text{Amount per } 100 \text{ ft}^2 &= \text{Initial weight} - \text{final weight} \\ \text{Amount per } 1000 \text{ ft}^2 &= \text{Amount per } 100 \text{ ft}^2 \times 10 \end{aligned}$$

5. Adjust and re-calibrate as needed to obtain the desired rate.

Another Method for Drop Spreaders

Calibration of drop spreaders can also be done as follows:

1. Calculate the distance the spreader has to travel to cover 1000 ft² by using the following equation:

$$\text{Feet to travel for } 1000 \text{ ft}^2 = \frac{1000 \text{ ft}^2}{\text{Width of swath}}$$

2. Measure the circumference of a wheel, in feet, by putting a string around the outside of it and then measuring the length of string.
3. Calculate the number of wheel revolutions necessary to cover 1000 ft² using this equation:

$$\text{Revolutions to cover } 1000 \text{ ft}^2 = \frac{\text{feet to travel } 1000 \text{ ft}^2}{\text{Circumference of wheel (ft)}}$$

4. Determine the amount of product the spreader applies in 1000 ft². Use the manual to determine preliminary settings. Suspend the spreader and place a tarp or piece of cardboard below it. Fill the spreader with product. Turn the wheel the number of times needed to cover 1000 ft² (step 3).
5. Weigh the chemical discharged by the spreader to determine the amount of product used per 1000 ft².
6. Adjust a recalibrate as needed to obtain the desired rate.

Maintenance and Cleaning

Proper care and maintenance will help retain precise applications and prolong the life of a granular spreader. Manufacturer's directions on cleaning and lubricating should be followed.

With the shutter or gate wide open, remove all granules from the spreader at the end of each application. If this is done on a tarp or cardboard, granules can be collected and added to the product container. Then, the spreader should be thoroughly washed and allowed to dry. Hot water may help break loose fertilizer which is caked on. Conduct cleaning on a grass surface to avoid potential runoff. Finally, lubricate the spreader according to instructions. A dry graphite lubricant should be used on most spreader components because oil and grease attract dirt and can result in premature wear. Granular spreaders should be stored in a clean, dry place out of direct sunlight.



FOR MORE INFORMATION:
South Dakota Department of Agriculture
Division of Agricultural Services
Office of Agronomy Services
523 E Capitol Ave – Foss Building
Pierre, SD 57501-3182
Phone – 605-773-4432
Fax – 605-773-3481
Internet Address www.state.sd.us/doa/das