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# Equipment considerations: dry granual fertilizer

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**Abstract**
A review of application equipment considerations can help ensure that your nitrogen fertilizer is properly applied. This article focuses on dry granular fertilizers and is the first in a series of three articles about nitrogen fertilizer application and equipment. Because of varying physical properties of dry fertilizer materials, it is important to consider material distribution across the swath as well as application rate.

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# Equipment considerations: dry granual fertilizer

A review of application equipment considerations can help ensure that your nitrogen fertilizer is properly applied. This article focuses on dry granular fertilizers and is the first in a series of three articles about nitrogen fertilizer application and equipment.

Because of varying physical properties of dry fertilizer materials, it is important to consider material distribution across the swath as well as application rate. Granular material is typically applied with a spinner spreader or custom-applied with a pneumatic spreader. Regardless of the method, a well-graded product of uniform size should be used to achieve uniform application. Material of nonuniform size tends to segregate during loading of the spreader and later in application. For example, if larger granular-size diammonium phosphate (DAP) is blended with smaller prilled urea, larger DAP particles roll to the outside of a pile when material is poured to form a cone. Filling the spreader box with a level fill or pouring many small cones helps to avoid this rolling.

In addition to loading, segregation occurs during application by ballistic action of fertilizer from spinners as larger particles are thrown further than smaller particles. Fine materials do not move very far from the spreader and require narrow spreader swath width. In particular, if urea or other materials have a significant percentage of particles less than 1 mm it is difficult to throw very far with a spinner and a narrower swath is required.

To avoid segregation consider spreading a single material rather than a blend. If two or more materials are blended, segregation can be nearly eliminated by particles having a similar size distribution. Generally, the amounts of each material collected on a particular size of graded screen should not differ by more than 10 percent of the total for that material. For example if 30 percent of one material is collected on a screen with 2-mm openings, the amount of other blended materials collected on the same size screen should be between 20 and 40 percent of their total weight.

Owners of spreader equipment should conduct a pattern check of all materials to be applied (especially materials not used previously). This check is accomplished by catching material in several pans laid out perpendicular to the spreader's travel direction. Dividers in the catch pans help limit material bouncing out of the pan. The check should be done in low-wind conditions with the spreader driven in the same travel direction as the wind. Multiple passes (always in the same direction) may be required to obtain enough granules to check by weight or volume.

Application rate in an individual pan may be calculated as follows:

**Application rate (lb/acre) = (392,000 x Wt)/(l x w)**

where Wt = weight of material (in ounces) in pan for a single pass, l = length of pan (in inches), and w = width of pan (in inches).

Optimum spread patterns for spinner spreaders have a relatively high, uniform application in the middle of the pattern that gradually tapers off on either side. Swath width is typically set as the distance between two points on either side of the swath that receive half the maximum application rate. Avoid simply adjusting swath width to obtain correct overall field rate of application. Streaking may result. Instead adjust overall application rate by adjusting the rate of material feed to the spinners. Common problems include high application on the outer swath edges from ballistic action of heavier particles being thrown further, and high application directly behind the spreader from material being carried over the spinners or fine particles. Adjustments are particular to an individual spinner spreader but may include gate opening, divider position (between two spinners), delivery point to the spinners, spinner speed, and vane-blade angle on the spinner. Distribution on pneumatic spreaders relies on uniform flow to each distribution tube and proper adjustment of trim tabs and deflectors at the exits of the tubes.

If you are unsure of the applicator's calibration and uniformity or of the swath width to use, it may be advantageous to make two trips over the field applying a half-rate each time. Distribution that is adequate for fertilizer from a dry granular spreader may not be adequate for herbicide if you are using impregnated herbicide on fertilizer. Ensure products are compatible and have been properly mixed, and make sure the swath pattern is adequate. Shallow soil incorporation with a field cultivator or disk after application may enhance herbicide distribution.

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