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Standard Guide for Preparing Granular Pesticide Ground Applicator Calibration Procedures[1]

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1. Scope

1.1 This guide is for those who prepare granular pesticide ground applicator calibration procedures. The purpose is to encourage methods that will improve uniformity and accuracy of application with granular applicators.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements see Section 4.

2. Significance and Use

2.1 This guide covers the calibration of row, band, and broadcast applicators. Attainment of accurate and more uniform application can reduce the quantity of active ingredient required for a given degree of control, thus improving environmental quality and safety at a more economical cost. A single-calibration procedure applicable in all situations is not feasible because of the nature of the variables involved in chemical applications.

3. Apparatus

3.1 Apparatus needed will depend on the method of calibration. Common equipment items include the following:

3.1.1 *Measuring Device*—Tape of at least 25 m (50 ft) in length, or other suitable measuring device.

3.1.2 *Marking Devices*—Stakes or flags for marking a measured course.

3.1.3 *Containers*—Paper, cloth, or plastic bags to collect granules.

3.1.4 *Weighing Device*—A scale for weighing granules in grams (or ounces) or kilograms (or pounds).

4. Hazards

4.1 A cautionary statement for the safe handling of agricultural chemicals shall be included with applicator calibration procedures.

5. Recommendations

5.1 The amount of granular material applied to a given area is dependent on six factors. It is recommended that each of the following variables be given consideration when developing specific calibration procedures:

5.1.1 *Orifice Area*—The area of the metering orifice must be adjusted to regulate the flow rate. The orifice area is determined by the orifice setting. Adjustments in the orifice setting should always be made in one direction only such as from closed to open to reduce variability in output for a particular setting.

5.1.2 *Ground Speed*—A constant speed of the applicator must be maintained for uniform application.

NOTE 1—The flow of granules through the orifice is not necessarily proportional to ground speed, even on applicators that use a rotor whose speed varies with ground speed.

5.1.3 *Product*—Each agricultural chemical applied requires a separate calibration since there is a wide variation in size, density, and shape of the granules. In addition, the nature of the inert materials varies.

5.1.4 *Width of Treatment*—Calibration procedures should be used to determine the amount in kilograms (or pounds) applied per unit area of surface in hectares (or acres) actually covered with the agricultural chemical. For band application, the area actually treated is the area in the band and not the area of cropland covered. Some row crop recommendations are based on treating "in-the-row" rather than the area actually covered. In these cases, recommendations are generally based on the amount of granules per row length (grams per 100 m or ounces per 1000 ft of row).

5.1.5 *Rotor Speed*—Consult the manufacturer's literature for recommended rotor speeds that will give maximum efficiency.

5.1.6 *Climatic Conditions*—Calibration adjustments must be made for changes in flow due to temperature and humidity variations.

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6. Calibration Procedures

6.1 Perform the following basic steps for the calibration of granular applicators:

6.1.1 Lay out a measured course in the field where the application will take place or in an area having similar soil and terrain conditions. To minimize the error in collecting granules, the acceleration and deceleration distances should be as short as possible and the total distance driven should be as long as practical.

6.1.2 Determine the ground speed that will be used. Except for the orifice setting, ground speed is the most significant factor affecting the application rate. Therefore, it is important to maintain a uniform speed during calibration and application.

6.1.3 Determine and set the initial orifice setting. Both chemical and equipment manufacturers furnish application rate charts that are intended to be a starting point for determining the correct orifice setting.

6.1.4 Fill the hopper(s) at least ½ full and operate the applicator until the granules are feeding from all units.

6.1.5 Attach a collection container under the opening(s).

6.1.6 Operate the applicator over the measured course at the speed determined in 6.1.2.

6.1.7 Weigh the granules collected from each unit of the applicator. A sufficient quantity of material must be collected during the test to allow for accurate weighing on the scales.

6.1.8 Calculate the application rate in accordance with 7.1.

6.1.9 Compare the amount collected in 6.1.6 or calculated in 6.1.8 with the recommended rate. If necessary, reset the applicators and recalibrate until the delivered application rate is within 5 % of the recommended rate.

6.1.10 Recalibrate frequently to compensate for any changes due to the variables listed in Section 5.

7. Calculations

7.1 The granular application rate may be determined by one of the following methods:

7.1.1 Granular application rate as calculated is the amount of granules per unit area. The quantity used is the total quantity of granules used by the applicator on a measured course. The area covered is the area actually treated on a measured course.

$$\text{Granular application rate} = \frac{\text{quantity used (kg or lb)}}{\text{area covered (hectares or acres)}} \quad (1)$$

7.1.2 *In-the-Row*—In-the-row applications are calculated directly by measuring the quantity in grams per 100 m (ounces per 1000 ft of row).

NOTE 2—If a chemical manufacturer lists the application rate for "in-the-row" applications as pounds per 40-in. row acre, it should be converted to ounces per 1000 ft of row by multiplying times 1.22.

7.1.3 *Miscellaneous*—Tables, charts, and special slide rules can be used where applicable. Special factors can be used if the length of the measured course is selected so that a known decimal or fractional part of an acre or hectare is covered with the application width used.

8. Keywords

8.1 agricultural; calibration; equipment; granular; ground applicator; pesticide