ASAE S327.4 JUL2012 (R2016)
Terminology and Definitions for Applications of Crop or Forestry Production and Protective Agents

American Society of Agricultural and Biological Engineers

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Terminology and Definitions for Application of Crop or Forestry Production and Protection Agents

Developed by the ASAE Agricultural Chemical Application Committee; approved by the PM Division Standards Committee; adopted by ASAE December 1969; reconfirmed December 1974; revised March 1980; reconfirmed December 1984, December 1989; revised March 1991; reaffirmed December 1995, January 2001, December 2001, February 2003; revised February 2007; revised July 2012; reaffirmed October 2016.

Keywords: Aerial application, Application, Chemical, Ground sprayer, Pesticide, Spraying, Spreading, Terminology

1 Scope

1.1 The purpose of this Standard is to establish uniform definitions used in the application of crop or forestry production and protection agents. The definitions are adopted from related fields where applicable.

1.2 The terms are appropriate for any agricultural, forestry, or vector control application. Units in parentheses following a definition are meant as typical and do not include all possible units available for the term.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies unless noted. For undated references, the latest approved edition of the referenced document (including any amendments) applies.

ASTM E609-10, Standard Terminology Relating to Pesticides

ASTM E799-03 (2009), Standard Practice for Determining Data Criteria and Processing for Liquid Drop Size Analysis

ASTM E1620-97(2004), Standard Terminology Relating to Liquid Particles and Atomization

ASTM E1102-91(2009), Standard Terminology Relating to Agriculture Chemical Application

ASAE S572.1, Spray Nozzle Classification by Droplet Spectra

ISO 5681:1992. Equipment for crop protection – Vocabulary

3 General chemical terms and characteristic measurements

3.1 Adjuvant: An ingredient added to a pesticide formulation to improve its performance.

3.2 Aerosol: Suspended particles or droplets are of size small enough to move with the air indefinitely, exhibiting little or no settling from the air column as a result of gravitational forces.

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3.3 Affected area (by a chemical droplet stain on a target): The area around the chemical droplet stain on a target at which the pest is fully controlled. Its boundaries are at the effective radial distance (ERD) from the droplet stain on the target.

3.4 Air flow rate: The flow rate of air, expressed in volume per relevant unit (m^3/s, m^3/tree).

3.5 Angle of repose: The acute angle formed between a horizontal surface and the slope of a pile of granules, powder, or dust at equilibrium after being poured from a fixed overhead point.

3.6 Application rate: The amount of any material applied per unit treated. May be expressed as a.i. or formulated product in L/ha, mg/tree, etc.

3.6.1 Active ingredient (a.i.) rate: The amount of active ingredient applied per unit treated, expressed in terms of mass per relevant unit treated (for area treatment, kg/ha; for space application, mg a.i./m^3; for individual units, mg. a.i./plant).

3.6.2 Carrier (diluent): A gas, liquid, or solid used to dilute the active ingredient and give it volume and mass to aid in metering and delivery.

3.6.3 Formulation rate: The amount of formulated product applied per unit treated, expressed in terms of mass or volume per relevant unit treated (for area treatment, kg/ha; for space application, mg/m^3; for individual units, mg/plant).

3.6.4 Volume rate: The total amount of spray liquid applied per unit treated (for area treatment, L/ha; for space treatment, mL/m^3; for individual units, L/plant, or L/tree).

3.7 Application variation (spray pattern uniformity): Expressed as the coefficient of variation (CV) of deposits collected by flat samplers or cups in the 2-dimensional plane of the field.

3.8 Bulk density: Ratio of granular, powder, or dust material mass to unit of volume (kg/m^3).

3.9 Collection device: Active or passive field sampling system for sprays or particles. Often includes cards, filter paper, strings, plastic sheets, air samplers and other artificial or natural media.

3.10 Concentration: Amount of active ingredient contained in the chemical formulation expressed as a percent or mass per relevant unit basis (mg a.i./L).

3.11 Deposit density: Number of droplets deposited per unit area (#/cm^2). Measured visually from deposits on cards, natural materials, or slices.

3.12 Deposit rate: The amount of any material deposited per unit area.

3.12.1 Effective spray deposit rate: The mean deposit from center to center of adjoining swaths.

3.12.2 Efficacy: Percentage of control of targeted pest after application and appropriate time intervals.

3.12.3 Mean deposit rate: The average amount of deposit over the entire spray swath.

3.12.4 Volume deposit rate: The amount of spray liquid deposited per unit area. (l/ha, gal/ac, micrograms/sq cm).

3.13 Deposit variation: Expressed as the coefficient of variation of any number of statistical indicators of droplet-stain deposition on targets at different points in a canopy.

3.14 Diluent: A gas, liquid, or solid used to reduce the concentration of the active ingredient in the formulation or application.

3.15 Drift: The movement of liquid or particulate material outside the intended target area by air mass transport or diffusion.

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3.15.1 Drift control adjuvant: Chemical designed to reduce off-target movement/deposition of droplets in agrochemical sprays.

3.15.2 Drift deposits: The deposition of chemical particles or droplets outside the intended target area.

3.15.3 Drift reduction nozzle/tip: Spray application atomizer that exhibits repeated and measurably less off-site movement of spray as compared with an explicitly stated nozzle/tip.

3.15.4 Drift reduction technology: Spray application technology that provides repeated and measurably less off-site movement of spray as compared with an explicitly stated spray application technology and conditions.

3.15.5 Lift-off: Air re-entrainment of small particles of dried spray deposits containing active ingredients from plant surfaces or the ground.

3.15.6 Post application volatilization (revolatilization): Volatilization of applied spray deposits containing active ingredient or other elements of the formulated product from plant surfaces or the ground.

3.15.7 Reduced drift: When a spray application exhibits repeated and measurably less off-site movement of spray as compared with an explicitly stated spray application.

3.15.8 Spray drift: Movement of spray droplets out of target area at time of application (primary spray drift) or at a later time (secondary spray drift) by any mechanism that causes spray particles or residue to become airborne.

3.15.9 Vapor drift: The dispersion of volatilized chemical to areas outside the target area.

3.16 Droplet stain size: Any number of statistical indicators of droplet stain diameters describing the droplet stain spectrum.

3.17 Effective radial distance (ERD): The imaginary distance from a chemical droplet stain on a target at which a pest is controlled by the chemical.

3.18 Fin: The vertical or curved protrusions on a rotary spreader impeller along which granules slide or roll while accelerating.

3.19 Formulation: The form of a chemical that is supplied to the user, and which includes both the active and inert ingredients.

3.20 Granule flow rate. Mass of granules flowing from a metering device per unit time, expressed in terms of mass per unit time (kg/min).

3.21 Impeller: The horizontal rotating disk with fins that provides the discharge acceleration to granules when using a rotary spreader.

3.22 Mean droplet diameter, $\overline{D_{pq}}$: $\overline{D_{pq}}$ is defined as:

$$\overline{D}_{pq}^{(p-q)} = \frac{\sum_i D_i^p}{\sum_i D_i^q}$$

where:

$\overline{D}$ = the overbar in D designates an averaging process

$(p\text{-}q)$ = the algebraic power of D_{pq}

p & q = the integers 0, 1, 2, 3, or 4

D_i = the representative diameter of the ith size class

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