



Designation: E 2316 – 03

# Standard Test Method for Determination of Particles Resulting from the Attrition of Granular Pesticides<sup>1</sup>

This standard is issued under the fixed designation E 2316; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method is used to determine the amount and particle size distribution curve of particles with diameter  $10^6$  micrometers or smaller resulting from the attrition of granular pesticides.

1.2 *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 statement, see Section 8.

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

E 11 Specification for Wire-Cloth Sieves for Testing Purposes

E 725 Test Method for Sampling Granular Carriers and Granular Pesticides

2.2 *CIPAC Standard:*

CIPAC Test Method MT 187<sup>3</sup>

## 3. Terminology

3.1 *Definitions:*

3.1.1 *finer*—a synonym for particles with diameter of  $10^6$  micrometers or smaller.

3.1.2 *micron and  $\mu\text{m}$* —synonyms for micrometer.

## 4. Summary of Test Method

4.1 The initial weight of a test sample of granular pesticide is determined. The sample is then air jet sieved using  $10^6$  micron openings to remove the inherent fines. The fines-free granules are then combined with glass beads in a glass jar, the lid is placed on the jar, and the jar is placed on a roller system

with a drive bed capable of rotating the jar at a known rpm. After rolling for a specified time period, the jar is removed from the rollers and the contents of the jar are poured through a sieve sized to remove the glass beads. The sample minus the glass beads is again air jet sieved using  $10^6$  micron openings to remove the fines attrited during the rolling of the jar. The total of particles smaller than  $10^6$  microns for the test sample is the inherent fines plus the attrited fines. The particle size distribution curve of the combined inherent and attrited fines is determined by laser light diffraction using CIPAC Test Method MT 187.

## 5. Significance and Use

5.1 This test method is designed specifically for granular pesticide formulations.

5.2 This test method helps provide information on health hazards likely to arise from exposures by the inhalation route. It can be of use in selecting dose levels for chronic studies and for establishing safety criteria for human exposure.

5.3 The amount of fines determined by this method is a measure of potential inhalation and respiration toxicity because the hazards of inhaled solid substances are influenced by physical factors such as particle size.

## 6. Apparatus

6.1 *Roller System*, two or more rollers with a drive bed, capable of rotating the specified glass jar at  $75 \pm 15$  rpm.

6.2 *Glass Jar*, with lid, capacity ~500 mL, outer diameter ~8 cm, height ~15 cm.

6.3 *Glass Beads*, diameter  $4.0 \pm 0.2$  mm, bulk density ~1.5 g/cc.

6.4 *Micron Air Jet Sieve*, with GAZ 125 cyclone fines collector or *Alpine Air Jet Sieve*, with GAZ 125 cyclone fines collector,<sup>4</sup> or equivalent.

6.5 *Sieves*, U.S. standard series conforming to Specification E 11, diameter 8 in. (203 mm), height 2 in. (51 mm): 10-mesh (2 mm openings), 140-mesh ( $10^6$   $\mu\text{m}$  openings).

NOTE 1—The amount of particles with sieve diameter  $10^6$   $\mu\text{m}$  or smaller is determined by sieving.

<sup>4</sup> The Micron Air Jet Sieve and the Alpine Air Jet Sieve use the same principle of design and working components. Both are products of Hosokawa Micron International of New York. The GAZ 125 cyclone fines collector is an accessory.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee E35 on Pesticides and Alternative Control Agents and is the direct responsibility of Subcommittee E35.22 on Pesticide Formulations and Delivery Systems.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The size distribution of the particles with sieve diameter less than  $10^6$   $\mu\text{m}$  is determined by laser light diffraction using CIPAC Test Method MT 187.