



Designation: E 2044 – 99

## Test Method for Spreading of Liquid Agricultural Spray Mixtures<sup>1</sup>

This standard is issued under the fixed designation E 2044; 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 covers the visual evaluation of the relative spread radius of liquid spray mixture droplets.

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.*

### 2. Referenced Documents

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

E 1519 Terminology Relating to Agricultural Tank Mix Adjuvants

### 3. Terminology

3.1 *Definitions:*

3.1.1 *adjuvant, n*—a material added to a tank mix to aid or modify the action of an agrochemical, or the physical characteristics of the mixture.

3.1.2 *spreader, n*—a material that increases the area that a droplet of a given volume of spray mixture will cover on a target.

3.1.3 *spread radius, n*—the radius in millimetres or some other standardized unit, of a substrate covered by a droplet.

### 4. Summary of Test Method

4.1 The material(s) to be tested is mixed using the desired concentration of each component.

4.2 A 20- $\mu$ L droplet of the spray mixture is placed carefully onto a substrate. Under this substrate is a graph with concentric rings spaced at 1-mm intervals.

4.3 After 60 s, the number of rings that the droplet covers, and thus the radius of the droplet, is observed and recorded.

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

### 5. Significance and Use

5.1 This test method is intended to provide a rapid means of determining the relative ability of a liquid agricultural spray mixture to spread on a test substrate.

5.2 This test method was validated using Parafilm M as a test substrate. It is the user's responsibility for determining the validity of this test method for alternative test surfaces. While it may be generally agreed upon that there is no perfect model for the variety of surfaces for which spreading information would be useful, this test method does not limit users to any one surface. Further consideration must also be given to the potential effect that the liquid droplet may have on the chemical composition and morphology of the test surface. While this does not restrict the test method, an understanding of this potential can help in the interpretation of test data.

5.3 This test method will determine the relative spread of radii of water, fertilizers, oils, and mixtures of these carriers with surfactants. It is the user's responsibility to determine the validity of the test method with alternative liquids.

5.4 This test method will determine the relative spread radii of droplets over 30 s, 60 s, and 5 min. It is the user's responsibility to determine the validity of the test method at alternative spreading times.

5.5 This test method is appropriate for relative humidities within the range of 40 to 70 %. It is the user's responsibility to determine the validity of the test method at alternative relative humidities.

5.6 This test method is appropriate for temperatures within the range of 18 to 22°C. It is the user's responsibility to determine the validity of the test method at alternative temperatures.

5.7 This test method will determine the relative spread radii for droplets of 10 and 20  $\mu$ L. It is the user's responsibility to determine the validity of the test method at alternative droplet sizes.

### 6. Apparatus

6.1 *Petri Dishes*, to be used inverted to make a flat surface on which to apply the intended test substrate. Other flat and uniform surfaces may be used.

6.2 *Test substrate* (Parafilm M).

6.3 *Stopwatch*.