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# Standard Test Method for Measuring Aspiration Potential of Aerosol Products[1]

This standard is issued under the fixed designation D7952; 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 (ε) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers a small-scale laboratory procedure to determine the aspiration potential of aerosol products by determining spray pattern and aerosol deposition rates.

1.2 This test method has been developed to address a need to identify which aerosol products may present an aspiration risk such that special labeling and/or child-resistant packaging would be appropriate. Studies based on this method may allow the development of a practice to identify such aerosol products.

1.3 Although this method may be useful for testing non-pressurized aerosol products, its development has been limited to testing pressurized aerosols.

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

1.5 *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. Terminology

2.1 *Definitions:*

2.1.1 *aerosol product, n*—a product that dispenses liquid as an aerosol.

2.1.2 *ballistic stream (or stream), n*—a stream pattern that deposits entirely in the test cup.

2.1.3 *cone spray, n*—spray pattern where the bottom of the test cup is completely covered during a 5 to 7 s test but a portion of the aerosol is deposited outside of the cup during the entire test.

2.1.4 *deposition rate, n*—the amount of aerosol (in grams) that dispenses in a test cup in one second.

2.1.5 *mist, n*—spray pattern where the aerosol only partially covers the bottom of the test cup during a 5 to 7 s test.

2.1.6 *pressurized aerosol product, n*—an aerosol product that is self-pressurized and does not require pumping to dispense an aerosol.

2.1.7 *spray pattern, n*—the pattern in which an aerosol is dispensed and deposited.

## 3. Summary of Test Method

3.1 After shaking and discarding 5 s worth of spray, the test aerosol is sprayed onto a test cup held in place with sticky wax from an aligning apparatus (see Fig. 1) for 5 to 7 s. The test cup is weighed before the test and within 60 s after concluding the test.

## 4. Significance and Use

4.1 This test method provides a means of measuring whether or not an aerosol product may present an aspiration risk if a dispensed aerosol gets into one's mouth.

4.2 The degree of risk for aspiration of an aerosol depends both on spray pattern as well as aerosol deposition rate.[2]

4.3 This test method will be used to determine the need for child-resistant packaging of aerosol products.

## 5. Apparatus

5.1 *Scale,* sensitive to 0.0001 g.

5.2 *6.0 cm Aluminum Weighing Cups.*

5.3 *Jeweler's Sticky Wax.*

5.4 *Stopwatch,* sensitive to 1/100th s.

5.5 *Plexiglas Sheet,* 2 by 3 ft.

5.6 *Aligning Apparatus,* See Fig. 1.

## 6. Procedure

6.1 Weigh weighing cup to nearest 0.0001 g and attach to middle of Plexiglas sheet with jeweler's sticky wax.

6.2 Set aligning apparatus at end of Plexiglas sheet so that vertical is exactly 11 in. (28 cm) from the center of the test cup.

[1] This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.57 on Artist Paints and Related Materials.

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[2] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D01-1179. Contact ASTM Customer Service at service@astm.org.

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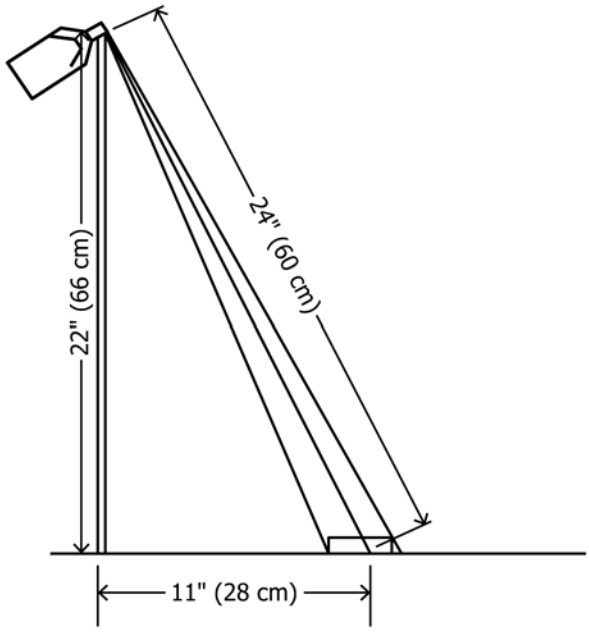


**FIG. 1 Orientation of Spray Can to Test Cup**

6.3 Shake aerosol container according to directions or for 1 min. if directions are not available.

6.4 Spray aiming to hit the middle of the test cup. Continue spraying for 5 to 7 s. Time the actual spraying time precisely with a stop watch.

6.5 Remove the test cup and re-weigh within 60 s.

6.6 Repeat the above sequence for a total of three test runs. After each run, clean Plexiglas surface with VM & P naphtha.

6.7 Record spray pattern and weight of aerosol deposited per run in g/sec.

6.8 Conduct spraying at an ambient temperature of 20 ± 2°C in a draft-free room.

## 7. Calculation or Interpretation of Results

7.1 Calculate average and standard deviation of deposition rate for each aerosol product.

7.2 Record spray pattern for each spray session.

7.3 A mist is defined as a spray pattern that does not completely cover the bottom of the test cup after 5 to 7 s of spraying.

7.4 A stream is defined as a spray pattern which is completely contained within the test cup: pooling of the test material occurs in the bottom of the cup.

7.5 A cone spray is defined as a spray pattern that completely covers the bottom of the test cup but where spray extends beyond the test cup. Pooling of sprayed material may occur in the bottom of the cup.

7.6 Mist sprays have a deposition rate of <0.05 g/sec.[2]

7.7 Streams have a deposition rate of >0.75 g/sec.[2]

7.8 Cone sprays have deposition rate that is intermediate between mists and streams.[2]

## 8. Report

8.1 A report of results should contain the following elements:

8.2 The type of aerosol product tested,

8.3 The average and standard deviation for aerosol deposition rate for each aerosol product,

8.4 The spray pattern for each aerosol product including whether or not pooling in the bottom of the cup is observed.

8.5 Interpretation of the results.

## 9. Precision and Bias

9.1 Between laboratory reproducibility precision will be determined within two years after this test method is published.

9.2 *Repeatability*—The within laboratory standard deviation and 95 % repeatability limits for testing a liquid art material are reported in Table 1.

**TABLE 1 Within Laboratory Variability in Determination of Aerosol Deposition Rates (11 degrees of freedom)**

| | Spray Lubricant | Spray Enamel 1 | Spray Enamel 2 |
|---|---|---|---|
| Mean value (g/sec) | 0.75 | 0.086 | 0.157 |
| Repeatability standard deviation | 0.067 | 0.004 | 0.006 |
| Repeatability 95 % confidence limits | ±0.13 | ±008 | ±0.012 |

9.3 *Bias*—Clogging of the aerosol tip will result in reduced aerosol deposition rates and may interfere with spray pattern interpretation. To avoid this bias, at least three samples for each aerosol spray type should be tested.

## 10. Keywords

10.1 aerosol; aspiration; mist

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