Designation: D1712 – 09 (Reapproved 2014)

Standard Practice for Resistance of Plastics to Sulfide Staining[1]

This standard is issued under the fixed designation D1712; 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 practice covers the determination of the resistance of plastics to staining in the presence of sulfides.

1.2 The values stated in SI units are to be regarded as the 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 precaution statements, see Section 6.

NOTE 1—There is no known ISO equivalent to this standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]
D618 Practice for Conditioning Plastics for Testing
D883 Terminology Relating to Plastics

3. Terminology

3.1 *Definitions:* For definitions of terms used in this practice, refer to Terminology D883.

4. Significance and Use

4.1 Plastic compositions containing salts of lead, cadmium, copper, antimony, and certain other metals (as stabilizers, pigments, driers, or fillers) may stain due to the formation of a metallic sulfide when in contact with external materials that contain sulfide. The external sulfide source may be liquid, solid, or gas. Examples of materials that may cause sulfide stains are rubber, industrial fumes, foods, kraft paper, etc. This practice provides a means of estimating the relative susceptibility of plastic composition to sulfide staining.

5. Reagent

5.1 *Hydrogen Sulfide Solution*—A freshly prepared saturated solution of hydrogen sulfide (**Caution,** see Section 6). Prepare the solution by rapidly bubbling hydrogen sulfide gas (Note 2) through water. Five minutes of bubbling is sufficient for 100 to 150 mL of water at room temperature (approximately 23°C).

NOTE 2—Hydrogen sulfide gas may be obtained commercially as compressed gas in cylinders.

6. Precautions

6.1 Hydrogen sulfide is a highly toxic gas and must be handled only in a suitably ventilated area such as a hood. Avoid breathing of vapors.

7. Sampling

7.1 Sampling shall be in accordance with the pertinent material specification or as agreed to by customer and client.

8. Test Specimens

8.1 Test specimens shall be representative of the particular plastic composition being tested. Size and shape of test specimens are relatively unimportant. Specimens 100 ± 25 mm (4 ± 1 in.) in length by 13 ± 6 mm (0.5 ± 0.25 in.) in width by the thickness of the composition being tested, have been found suitable for this test.

9. Conditioning

9.1 *Conditioning*—Condition the test specimens at 23 ± 2°C (73.4 ± 3.6°F) and 50 ± 10 % relative humidity for not less than 40 h prior to test in accordance with Procedure A of Practice D618 for those tests where conditioning is required. In cases of disagreement, the tolerances shall be ±1°C (±1.8°F) and ±5 % relative humidity.

9.2 *Test Conditions*—Conduct tests in the standard laboratory atmosphere of 23 ± 2°C (73.4 ± 3.6°F) and 50 ± 10 % relative humidity, unless otherwise specified in the test methods or in this specification. In cases of disagreements, the tolerances shall be ±1°C (±1.8°F) and ±5 % relative humidity.

10. Procedure

10.1 Using a 250-mL beaker or equivalent, immerse approximately half of each specimen (Note 3) in the saturated

[1] This practice is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.50 on Durability of Plastics.

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[2] 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.

***A Summary of Changes section appears at the end of this standard**

hydrogen sulfide solution for 15 min (Note 4). Cover the test container with a watch glass or aluminum foil during the test.

NOTE 3—It is recommended that a control material, whose tendency to sulfide stain is known, be included with each test series. This provides a reference point from series to series. Staining may be rated as more, less, or equal to that of the control.

NOTE 4—If desired, additional specimens may be tested for different periods of time. Suggested periods of immersion are 5, 15, 30, 60, and 120 min. If immersion times greater than 30 min are desired, remove the specimens from the reagent each 30 min and again bubble hydrogen sulfide gas through the solution for 3 min. Reimmerse the specimens and continue the test. Do not dry the specimens during the time they are removed for reconcentration of the solution. Time compensation will not be necessary for the period the specimens are not immersed.

10.2 After immersion for 15 min, remove the specimens, wipe dry, and examine for discoloration of the immersed section compared to a sample of the identical plastic composition not exposed to hydrogen sulfide solution.

10.3 Compare the relative degree of staining for each material being tested in a series, and establish their relative order of sulfide stain resistance.

11. Report

11.1 The report shall include the following:

11.1.1 Complete identification of the material tested, including type, source, manufacturer's code numbers, form, previous history, and other pertinent information,

11.1.2 Duration of exposure, and

11.1.3 Effects of exposure, including whether or not staining occurred, color of stain, and severity of staining in relation to other materials in the series or in relation to a control material, if included.

12. Precision and Bias

12.1 Since the results of this practice are subjective descriptions, statements of precision and bias are not pertinent to the practice.

13. Keywords

13.1 hydrogen sulfide; staining; sulfide