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Standard Test Methods for Carbon Black—pH Value[1]

This standard is issued under the fixed designation D1512; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods, Test Method A—Boiling Slurry and Test Method B—Sonic Slurry, are used to indicate the pH of the carbon black surface by measuring the pH of water in contact with the carbon black.

NOTE 1—The pH of the carbon black is often used in this industry to indicate the relative acidity or alkalinity of carbon black and will be used in the remainder of these test methods to describe this property.

NOTE 2—Test Method A and Test Method B do not always give the same results.

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1193 Specification for Reagent Water
D1799 Practice for Carbon Black—Sampling Packaged Shipments
D1900 Practice for Carbon Black—Sampling Bulk Shipments
D4483 Practice for Evaluating Precision for Test Method Standards in the Rubber and Carbon Black Manufacturing Industries
E70 Test Method for pH of Aqueous Solutions With the Glass Electrode

3. Significance and Use

3.1 The pH level of a carbon black is known to affect the vulcanization of some rubber compounds.

TEST METHOD A—BOILING SLURRY

4. Apparatus

4.1 *pH Meter,* (digital is recommended) having an accuracy of ±0.05 pH and equipped with a combination electrode and RNC connector.

4.2 *Container,* stainless steel or copper, 125 cm^3 or larger.

4.3 *Hot Plate.*

4.4 *High Speed Mill, Mixer or Mortar and Pestle.*

4.5 *Beakers,* glass, 100 cm^3 graduated with watch glasses.

4.6 *Magnetic Stir Plate.*

4.7 *Magnetic Stir Bars.*

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[1] These test methods are under the jurisdiction of ASTM Committee D24 on Carbon Black and are the direct responsibility of Subcommittee D24.31 on Non-Carbon Black Components of Carbon Black.

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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.

5. Reagents

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[3] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

5.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type 1 in Specification D1193.

5.3 *Distilled Water,* high purity.

5.4 *Buffer Solutions,* pH of 4.00, 7.00, and 10.00.

5.5 *Acetone,* reagent grade.

6. Sampling

6.1 Samples shall be taken in accordance with Practices D1799 or D1900.

7. Calibration

7.1 Calibrate the pH meter using buffer solutions according to manufacturer's instructions.

8. Procedure

8.1 Pulverize pelleted or lumpy carbon black to a fine powder, using either the high speed mixer or mortar and pestle.

8.2 Weigh 5 g of carbon black into a 100 cm^3 glass beaker.

8.3 Add 50 cm^3 of boiling, distilled water prepared in a stainless steel beaker and 2 to 3 drops of acetone to facilitate wetting of the sample.

NOTE 3—A stainless steel beaker is used to eliminate contamination during boiling.

8.4 Cover the glass beaker with a watch glass and boil the mixture for 15 min, but do not allow all the liquid to evaporate.

8.5 Let the mixture cool to room temperature in an atmosphere free from chemical fumes which might contaminate the sample.

8.6 Standardize the pH meter with the buffer solutions. Rinse the electrode with distilled water and wipe clean after each test.

8.7 Place a magnetic stir bar into the glass beaker and place on magnetic stir plate (or similar mechanical stirring device) and adjust the stir speed to achieve a continuous uniform slurry. Carefully place the pH electrode into the slurry taking care not to allow the electrode to contact the stir bar. Once a constant pH is obtained record to the nearest 0.05 unit.

NOTE 4—Refer to Test Method E70 for a definition of pH and a highly detailed procedure for making pH measurements.

8.8 Rinse the electrode with distilled water and wipe clean. Keep the electrode soaking in distilled water when not in use.

9. Report

9.1 Report the following information:
9.1.1 Proper identification of the sample,
9.1.2 Result obtained, reported to the nearest 0.05 unit, and
9.1.3 Test Method used, A or B.

[3] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

TABLE 1 Precision Parameters for ASTM D1512, Carbon Black -- pH Value, Method A, (Type 1 Precision)

Units		pH Units					
Material	Period	Number of Laboratories	Mean Level	Sr	r	SR	R
HS Tread	Fall 2003	22	6.2	0.15	0.43	0.73	2.07
SRB A6 (N134)	Fall 2004	23	6.5	0.15	0.41	0.53	1.49
LS Carcass	Spring 2004	26	7.2	0.14	0.39	0.50	1.41
SRB C6 (N326)	Spring 2003	27	8.5	0.11	0.32	0.50	1.41
N774	Fall 2002	19	8.6	0.16	0.45	0.62	1.75
Average			7.4				
Pooled Values				0.14	0.40	0.58	1.65