Designation: D7679 – 11

StandardTest Method for Sulfur Content in Carbon Black Feedstock Oils[1]

This standard is issued under the fixed designation D7679; 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 the instrumental determination of sulfur content in samples of carbon black feedstock oils. Values obtained represent the total sulfur content. Two analysis methods are available for use:

Test Method A: High-Temperature Combustion With Infrared Absorption Detection Procedures	Sections 4-10
Test Method B: X-Ray Fluorescence	Sections 11-15

1.2 This test method is applicable to carbon black feedstock oils derived from petroleum, coal, and other sources which include fuel oils, residues, tars, pitches, reclaimed oils, and similar materials that are normally handled as liquids. This test method is applicable to products typically containing 0 to 5 mass % sulfur.

1.3 The results of these tests can be expressed as mass % sulfur.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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. Referenced Documents

2.1 *ASTM Standards:*[2]

D1619 Test Methods for Carbon Black—Sulfur Content

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

3. Significance and Use

3.1 Measuring the total sulfur content of feedstock oil is often a necessary component in calculations for sulfur dioxide emissions.

3.2 The carbon black industry measures sulfur content of feedstock oils along with sulfur content of carbon black products per Test Method D1619 in calculations to determine sulfur dioxide emissions for compliance with governmental reporting requirements.

TEST METHOD A: HIGH-TEMPERATURE COMBUSTION WITH INFRARED ABSORPTION DETECTION PROCEDURES

4. Summary of Test Method

4.1 In this test method, a sample of feedstock oil is weighed in a combustion boat containing either a tungsten oxide based accelerator, sand or aluminum oxide absorbent, and the sulfur content is determined by placing the boat in a tube furnace at 1350°C in an air or oxygen-enriched atmosphere resulting in complete combustion. Sulfur in the sample is completely oxidized to sulfur dioxide. Moisture and particulates are removed from the gas stream by traps filled with anhydrous magnesium perchlorate. The gas stream is then passed through a cell in which sulfur dioxide concentration is measured by an infrared (IR) absorption detector at a precise wavelength in the IR spectrum. The IR absorption detects sulfur dioxide throughout the entire combustion process. The integral of the detector signal is the basis for the total sulfur content of a sample.

4.2 This test method is for use with commercially available sulfur analyzers equipped to carry out the combustion and measurement operations automatically.

4.3 The sulfur analyzer shall be calibrated using appropriate calibration standards (see 6.7).

4.4 The instrument may be configured to analyze more than one element such as a carbon-sulfur analyzer. In this case, the analyzer has individual detectors for each element that are arranged in series.

5. Apparatus

5.1 There are a number of commercially available instruments designed to measure sulfur content in organic materials

[1] This test method is under the jurisdiction of ASTM Committee D24 on Carbon Black and is the direct responsibility of Subcommittee D24.66 on Environment, Health, and Safety.

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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.