



Designation: D5056 – 04(Reapproved 2010)

## Standard Test Method for Trace Metals in Petroleum Coke by Atomic Absorption<sup>1</sup>

This standard is issued under the fixed designation D5056; 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 analysis for the commonly determined trace metals (aluminum, calcium, iron, nickel, silicon, sodium, and vanadium) in laboratory analysis samples of raw and calcined petroleum coke by atomic absorption spectroscopy.

1.2 The elemental concentration ranges for which this test method is applicable and the limits of detection of this test method are listed in [Table 1](#).

1.3 The values stated in SI units are to be regarded as the standard.

1.4 *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 warning statements, see Sections 8-10.

### 2. Referenced Documents

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

[D346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis](#)

[D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance](#)

[D1193 Specification for Reagent Water](#)

### 3. Summary of Test Method

3.1 A representative sample of the petroleum coke is ashed at 525°C under specified conditions. The ash is fused with lithium tetraborate ( $\text{Li}_2\text{B}_4\text{O}_7$ ), or lithium metaborate ( $\text{LiBO}_3$ ). The melt is dissolved in dilute hydrochloric acid (HCl), and the resultant solution is analyzed by atomic absorption spectroscopy.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.03 on Elemental Analysis.

Current edition approved May 1, 2010. Published May 2010. Originally approved in 1990. Last previous edition approved in 2004 as D5056-04. DOI: 10.1520/D5056-04R10.

<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.

copy for the following elements: aluminum, calcium, iron, nickel, silicon, sodium, and vanadium.

### 4. Significance and Use

4.1 The presence and concentration of various metallic elements in a petroleum coke are major factors in the suitability of the coke for various uses. This test method provides a means of measuring the amounts of those metallic elements in the coke sample.

4.2 The test method provides a standard procedure for use by the purchaser and seller in the commercial transfer of petroleum coke to determine whether the lot of coke meets the specifications of the purchasing party.

### 5. Interferences

5.1 Spectral interferences can occur when using other than the recommended wavelength for analysis or when using multi-elemental hollow cathode lamps.

### 6. Apparatus

6.1 *Furnace*, electric, capable of regulation of temperature at 525°C  $\pm$  10°C.

6.2 *Magnetic Stirring Hot Plate*.

6.3 *Platinum Dish*, 50 to 58-mL capacity.

6.4 *Platinum Dish*, 150 to 200-mL capacity.

6.5 *Platinum-Tipped Tongs*.

6.6 *Furnace*, electric, capable of regulation of temperature at 950  $\pm$  10°C or a Meker type forced air burner.

6.7 *Atomic Absorption Spectrophotometer (AAS)*, equipped as follows:

6.7.1 *Background Correction*, using either a deuterium ( $\text{D}_2$ ) arc background corrector or other comparable simultaneous background correction system.

6.7.2 *Burner Head*, capable of supporting a nitrous oxide-acetylene flame.

6.7.3 *Burner Head*, single or multiple-slot, capable of supporting an air-acetylene flame.

6.7.4 *Hollow Cathode Lamps*, one for each of the elements to be analyzed: aluminum, calcium, iron, nickel, silicon, sodium, and vanadium.

NOTE 1—Multi-elemental lamps can also be used; however, spectral

interferences are possible (see 5.1).

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[ASTM D5056-04\(2010\)](#)

<https://standards.iteh.ai/catalog/standards/sist/c741aecf-2a4d-4fd5-9f13-88e06ae5baf5/astm-d5056-042010>