



Designation: D 5056 – 9602

An American National Standard

Standard Test Method for Trace Metals in Petroleum Coke by Atomic Absorption¹

This standard is issued under the fixed designation D 5056; 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 This test method is under the jurisdiction of ASTM Committee D-2, D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.03, D02.03 on Spectrometric Methods—Elemental Analysis.

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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 hazard statements, see Sections 8, 9 and 10. 8-10.

2. Referenced Documents

2.1 *ASTM Standards:*

D 346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis²

D 6299 Practice for Applying Statistical Quality Assurance Techniques to Evaluate Analytical Measurement System Performance³

D 1193 Specification for Reagent Water⁴

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 (Li₂B₄O₇), or lithium metaborate (LiBO₃). The melt is dissolved in dilute hydrochloric acid (HCl), and the resultant solution is analyzed by atomic absorption spectroscopy 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 ± 10°C.

² *Annual Book of ASTM Standards*, Vol 05.051.

³ *Annual Book of ASTM Standards*, Vol 11.04: 05.03.

⁴ *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 ASTM Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD; Vol 11.01.

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