



Standard Practice for Optimization, Calibration, and Validation of Atomic Absorption Spectrometry for Metal Analysis of Petroleum Products and Lubricants¹

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1. Scope

1.1 This practice covers information on the calibration and operational guidance for elemental measurements using atomic absorption spectrometry (AAS).

1.1.1 AAS *Related Standards*—Test Methods [D1318](#), [D3237](#), [D3340](#), [D3605](#), [D3831](#), [D4628](#), [D5056](#), [D5184](#), [D5863](#), [D6732](#); Practices [D7260](#) and [D7455](#); and Test Methods [D7622](#) and [D7623](#).

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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.*

2. Referenced Documents

2.1 *ASTM Standards*:²

[D1318](#) Test Method for Sodium in Residual Fuel Oil (Flame Photometric Method)

[D3237](#) Test Method for Lead in Gasoline by Atomic Absorption Spectroscopy

[D3340](#) Test Method for Lithium and Sodium in Lubricating Greases by Flame Photometer (Withdrawn 2013)³

[D3605](#) Test Method for Trace Metals in Gas Turbine Fuels by Atomic Absorption and Flame Emission Spectroscopy

[D3831](#) Test Method for Manganese in Gasoline By Atomic Absorption Spectroscopy

[D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products

[D4177](#) Practice for Automatic Sampling of Petroleum and Petroleum Products

[D4307](#) Practice for Preparation of Liquid Blends for Use as Analytical Standards

[D4628](#) Test Method for Analysis of Barium, Calcium, Magnesium, and Zinc in Unused Lubricating Oils by Atomic Absorption Spectrometry

[D5056](#) Test Method for Trace Metals in Petroleum Coke by Atomic Absorption

[D5184](#) Test Methods for Determination of Aluminum and Silicon in Fuel Oils by Ashing, Fusion, Inductively Coupled Plasma Atomic Emission Spectrometry, and Atomic Absorption Spectrometry

[D5863](#) Test Methods for Determination of Nickel, Vanadium, Iron, and Sodium in Crude Oils and Residual Fuels by Flame Atomic Absorption Spectrometry

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

[D6732](#) Test Method for Determination of Copper in Jet Fuels by Graphite Furnace Atomic Absorption Spectrometry

[D6792](#) Practice for Quality System in Petroleum Products and Lubricants Testing Laboratories

[D7260](#) Practice for Optimization, Calibration, and Validation of Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) for Elemental Analysis of Petroleum Products and Lubricants

[D7455](#) Practice for Sample Preparation of Petroleum and Lubricant Products for Elemental Analysis

[D7622](#) Test Method for Total Mercury in Crude Oil Using Combustion and Direct Cold Vapor Atomic Absorption Method with Zeeman Background Correction

[D7623](#) Test Method for Total Mercury in Crude Oil Using Combustion-Gold Amalgamation and Cold Vapor Atomic Absorption Method

¹ This practice is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.03 on Elemental Analysis.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.