



Standard Test Method for Determination of Contaminants in Gas Turbine and Diesel Engine Fuel by Rotating Disc Electrode Atomic Emission Spectrometry¹

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1. Scope*

1.1 This test method covers the determination of contaminants and materials as a result of corrosion in gas turbine or diesel engine fuels by rotating disc electrode atomic emission spectroscopy (RDE-AES).

1.1.1 The test method is applicable to ASTM Grades 0-GT, 1-GT, 2-GT, 3-GT, and 4-GT gas turbine fuels and Grades Low Sulfur No. 1-D, Low Sulfur No. 2-D, No. 1-D, No. 2-D, and No. 4-D diesel fuel oils.

1.1.1.1 Trace metal limits of fuel entering turbine combustor(s) are given as 0.5 mg/kg each for vanadium, sodium + potassium, calcium, and lead in Specification D2880 for all GT grades.

1.1.2 This test method provides a rapid at-site determination of contamination and corrosive elements ranging from fractions of mg/kg to hundreds of mg/kg in gas turbine and diesel engine fuels so the fuel quality and level of required treatment can be determined.

1.1.3 This test method uses oil-soluble metals for calibration and does not purport to quantitatively determine or detect insoluble particles.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard. The preferred units are mg/kg (ppm by mass).

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.*

¹ This test method 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. Referenced Documents

2.1 ASTM Standards:²

D975 Specification for Diesel Fuel Oils

D2880 Specification for Gas Turbine Fuel Oils

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

D5854 Practice for Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products

D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

3. Terminology

3.1 Definitions:

3.1.1 *burn, vt—in emission spectroscopy*, to vaporize and excite a specimen with sufficient energy to generate spectral radiation.

3.1.2 *calibration, n*—the determination of the values of the significant parameters by comparison with values indicated by a set of reference standards.

3.1.3 *calibration curve, n*—the graphical or mathematical representation of a relationship between the assigned (known) values of standards and the measured responses from the measurement system.

3.1.4 *calibration standard, n*—a standard having an accepted value (reference value) for use in calibrating a measurement instrument or system.

3.1.5 *detection limit, n*—the smallest concentration of an element that can be measured for specific analysis conditions and data collection periods.

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.