



Standard Test Method for Determination of Wear Metals and Contaminants in Used Lubricating Oils or Used Hydraulic Fluids by Rotating Disc Electrode Atomic Emission Spectrometry¹

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1. Scope*

1.1 This test method covers the determination of wear metals and contaminants in used lubricating oils and used hydraulic fluids by rotating disc electrode atomic emission spectroscopy (RDE-AES).

1.2 This test method provides a quick indication for abnormal wear and the presence of contamination in new or used lubricants and hydraulic fluids.

1.3 This test method uses oil-soluble metals for calibration and does not purport to relate quantitatively the values determined as insoluble particles to the dissolved metals. Analytical results are particle size dependent and low results may be obtained for those elements present in used oil samples as large particles.

1.4 The test method is capable of detecting and quantifying elements resulting from wear and contamination ranging from dissolved materials to particles approximately 10 μm in size.

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

1.5.1 The preferred units are mg/kg (ppm by mass).

1.6 *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

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

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 *emission spectroscopy, n*—measurement of energy spectrum emitted by or from an object under some form of energetic stimulation; for example, light, electrical discharge, and so forth.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *arc discharge, n*—a self-sustaining, high current density, high temperature discharge, uniquely characterized by a cathode fall nearly equal to the ionization potential of the gas or vapor in which it exists.

3.2.2 *check sample, n*—a reference material usually prepared by a laboratory for its own use as a calibration standard, as a measurement control standard, or for the qualification of a measurement method.

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 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.