



Designation: D8315 – 20

Standard Test Method for Determination of Wear Metals and Contamination Elements in Used Industrial Oils by Sweeping Flat Electrode Atomic Emission Spectrometry¹

This standard is issued under the fixed designation D8315; 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. Scope

1.1 This test method covers the determination of wear metals and contaminants in used industrial oils by sweeping flat electrode atomic emission spectroscopy (SFE-AES).²

1.2 Industrial oil includes lubricant oil, gear box oil, hydraulic fluid, compressor oil, turbine oil, synthetic oils, and other petroleum oils.

1.3 Method working range for every element is evaluated by equations in 15.2.1 and tabulated in Table 6.

1.4 Though this technique is designed to analyze non-suspended particles in lubricant samples, the precision statements published here were established solely from homogeneous oil samples per Practice D6300 requirements. Non-suspended particles, which are inhomogeneous by nature, were not sampled and evaluated for deriving precision statements for this test method (see Annex A1).

1.5 This test method provides a quick indication for abnormal wear and the presence of contamination in new or used industrial oils by immediately reporting:

- 1.5.1 Normal fine particles of specific wear metals;
- 1.5.2 Non-suspendable particles of specific wear metals and of contamination elements;
- 1.5.3 Less populated large particles (10 μm to 50 μm) of specific wear metals;
- 1.5.4 Contamination elements; and
- 1.5.5 Additive elements.

1.6 This test method uses oil-soluble elements for calibration and does not purport to relate quantitatively the values determined as insoluble particles to the dissolved metals.

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.

Current edition approved June 1, 2020. Published July 2020. DOI: 10.1520/D8315-20.

² The sole source of supply of the apparatus (COA Oil & Grease Analyzer and accessories) known to the committee at this time is CYCP Oil Analyzers, LLC., 7 Beths Rd, Shrewsbury, MA 01545, www.cycp-oilanalyzers.com. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

Analytical results are particle size dependent and low results may be obtained for those elements present in used oil samples as large particles (referenced by Test Methods D5185 and D6595).

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

1.8 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*³

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

D5185 Test Method for Multielement Determination of Used and Unused Lubricating Oils and Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)

D6300 Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products, Liquid Fuels, and Lubricants

D6595 Test Method for Determination of Wear Metals and Contaminants in Used Lubricating Oils or Used Hydraulic Fluids by Rotating Disc Electrode Atomic Emission Spectrometry

³ 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.