



Designation: D8544 – 24

# Standard Test Method for Determination of Conductive Deposits of Electrical and Mechanical Components from Fluids in Liquid and Vapor States within an Electrically Charged System<sup>1</sup>

This standard is issued under the fixed designation D8544; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers the basic operation of the conductive deposit test. The apparatus is utilized to monitor the formation of dendrites and deposits that are conductive and may form under oxidation conditions of fluids used in electric vehicles and other industries where electronics are involved. The oxidation conditions can vary from 80 °C to 180 °C with very specific circuit boards, under power, and monitoring changes in conductance over time. Both the liquid and vapor areas are monitored for this condition over time. Variables in temperature, voltage, and time can be altered according to the industry need. A reported index based on the rate of deposit formation may be implemented. The typical testing is performed at 150 °C over a period of up to 500 h with a monitored voltage applied.

NOTE 1—Testing up to 1000 h has some historical significance and is an option but not covered in this test method.

1.2 This test method has an interim precision. An interlaboratory study of this test method is being conducted and a complete precision statement is expected to be available on or before December 2024.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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 Recom-*

*mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

**D130** Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

**D4057** Practice for Manual Sampling of Petroleum and Petroleum Products

**D4175** Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

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

**E986** Practice for Scanning Electron Microscope Beam Size Characterization

### 2.2 SAE Standard:<sup>3</sup>

**SAE J3200** Fluid for Automotive Electrified Drivetrains

## 3. Terminology

### 3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminology **D4175**.

3.1.2 *conductive deposits, n*—in electric vehicle drivelines and other powered systems, material adhering to or collecting on electrical components that conduct electricity.

3.1.3 *conductive deposit factor, n*—a value that is used to estimate the amount of conductive deposits being formed over time and is calculated using a log summation of the area between the beginning resistance baseline and the resistance curve formed by the arcing conductive deposit events over time.

<sup>1</sup> 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 **D02.09.0G** on Oxidation Testing of Engine Oils.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096, <http://www.sae.org>.