



Designation: D8240 – 22

# Standard Specification for Less-Flammable Synthetic Ester Liquids Used in Electrical Apparatus<sup>1</sup>

This standard is issued under the fixed designation D8240; 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 specification covers less-flammable (high fire point) synthetic ester insulating liquids for use as a dielectric and cooling in new and existing electrical power apparatus including power and distribution transformers, switchgear, and other associated equipment

1.2 Synthetic ester insulating liquids differ from conventional mineral oil and other less-flammable (high fire point) liquids in that they are products derived from the chemical reaction, processing, and physical treatments of a carboxylic acid and an alcohol.

1.3 This specification is intended to define synthetic ester electrical insulating liquids that are compatible with typical materials of construction of existing apparatus and are expected to maintain their functional characteristics in these applications. The material described in this specification is not always miscible with other electrical insulating liquids. The user should contact the manufacturer of the synthetic ester insulating liquid for guidance in this respect.

1.4 This specification applies only to unused synthetic ester insulating liquids as received prior to any processing. The user should contact the manufacturer of the equipment or liquid, or both, if questions of recommended characteristics or liquid maintenance procedures arise.

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

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

1.7 *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:<sup>2</sup>

- D92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester
- D97 Test Method for Pour Point of Petroleum Products
- D117 Guide for Sampling, Test Methods, and Specifications for Electrical Insulating Liquids
- D445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
- D93 Practices for Sampling Electrical Insulating Liquids
- D224 Test Method for Dissipation Factor (or Power Factor) and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids
- D974 Test Method for Acid and Base Number by Color-Indicator Titration
- D1275 Test Method for Corrosive Sulfur in Electrical Insulating Liquids
- D1298 Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- D1524 Test Method for Visual Examination of Used Electrical Insulating Liquids in the Field
- D1533 Test Method for Water in Insulating Liquids by Coulometric Karl Fischer Titration
- D1816 Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using VDE Electrodes
- D1903 Practice for Determining the Coefficient of Thermal Expansion of Electrical Insulating Liquids of Petroleum Origin, and Askarels
- D2129 Test Method for Color of Clear Electrical Insulating Liquids (Platinum-Cobalt Scale)
- D2300 Test Method for Gassing of Electrical Insulating

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D27 on Electrical Insulating Liquids and Gases and is the direct responsibility of Subcommittee D27.02 on Gases and Non-Mineral Oil Liquids.

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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.