



Designation: D3809 – 01(Reapproved 2006)

## Standard Test Methods for Synthetic Dielectric Fluids For Capacitors<sup>1</sup>

This standard is issued under the fixed designation D3809; 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 These test methods cover testing synthetic dielectric fluids currently in use for capacitors. The methods are generally suitable for specification acceptance, factory control, referee testing, and research. Their applicability to future fluids has not been determined.

1.2 The scope of some of the test methods listed here apply to petroleum oils, but have been found suitable for synthetic fluids.

1.3 For methods relating to polybutene fluids refer to Specification [D2296](#).

1.4 For methods relating to silicone fluids refer to Test Methods [D2225](#).

1.5 A list of properties and standards are as follows:

Property Measured	Section	ASTM Test Method
<i>Physical:</i>		
Coefficient of thermal expansion	6	<a href="#">D1903</a>
Flash point	7	<a href="#">D92</a>
Pour point	8	<a href="#">D97</a>
Refractive index	9	<a href="#">D1218</a>
Relative Density/Specific gravity	10	<a href="#">D1298</a>
Viscosity	11	<a href="#">D445</a>
<i>Chemical:</i>		
Acid number	12	<a href="#">D664</a>
Water content	13	<a href="#">D1533</a>
<i>Electrical:</i>		
Relative permittivity	14	<a href="#">D924</a>
Dielectric strength	15	<a href="#">D877</a>
		<a href="#">D1816</a>
Dissipation factor	16	<a href="#">D924</a>

1.6 *This standard does not purport to address all of the safety problems, 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.*

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee [D27](#) on Electrical Insulating Liquids and Gases and are the direct responsibility of Subcommittee [D27.02](#) on Gases and Non-Mineral Oil Liquids.

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### 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](#)
- [D445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids \(and Calculation of Dynamic Viscosity\)](#)
- [D664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration](#)
- [D877 Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes](#)
- [D923 Practices for Sampling Electrical Insulating Liquids](#)
- [D924 Test Method for Dissipation Factor \(or Power Factor\) and Relative Permittivity \(Dielectric Constant\) of Electrical Insulating Liquids](#)
- [D1218 Test Method for Refractive Index and Refractive Dispersion of Hydrocarbon Liquids](#)
- [D1298 Test Method for Density, Relative Density \(Specific Gravity\), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method](#)
- [D1533 Test Method for Water in Insulating Liquids by Coulometric Karl Fischer Titration](#)
- [D1816 Test Method for Dielectric Breakdown Voltage of Insulating Oils of Petroleum Origin Using VDE Electrodes](#)
- [D1903 Practice for Determining the Coefficient of Thermal Expansion of Electrical Insulating Liquids of Petroleum Origin, and Askarels](#)
- [D2225 Test Methods for Silicone Fluids Used for Electrical Insulation](#)
- [D2296 Specification for Continuity of Quality of Electrical Insulating Polybutene Oil for Capacitors](#)
- [D2864 Terminology Relating to Electrical Insulating Liquids and Gases](#)

<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.