



Standard Test Methods for Silicone Fluids Used for Electrical Insulation¹

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1. Scope

1.1 These test methods cover the testing of silicone fluids for use in transformers, capacitors, and electronic assemblies as an insulating or cooling medium, or both. These methods are generally suitable for specification acceptance, factory control, referee testing, and research.

1.2 Although some of the test methods listed here apply primarily to petroleum-based fluids, they are, with minor revisions, equally applicable to silicone fluids.

1.3 Silicone fluids are used for electrical insulating purposes because of their stable properties at high and low temperatures and their relative environmental inertness.

1.4 A list of the properties and standards are as follows:

Property Measured	Section	ASTM Test Method
<i>Physical:</i>		
Color	6	D 2129
Flash point	7	D 92
Fire point	7	D 92
Polychlorinated biphenyl content	8	D 4059
Pour point	9	D 97
Refractive index	10	D 1807
Specific gravity	11	D 1298, D1481, D4052
Volatility	12	D 4559
Viscosity	13	D 445, D2161
<i>Chemical:</i>		
Neutralization number	14	D 974
Water content	15	D 1533
<i>Electrical:</i>		
Relative permittivity	16	D 924 ²
Dielectric breakdown voltage	17	D 877 ³
Dissipation factor	18	D 924 ²
Specific resistance	19	D 1169 ²
Compatibility	20	D 5282

1.5 *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:

¹ These test methods are under the jurisdiction of ASTM Committee D-27 on Electrical Insulating Liquids and Gases and are the direct responsibility of Subcommittee D27.02 on Synthetics.

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² A modified cell cleaning procedure is given for Test Methods D 924 and D 1169.

³ A modified cell cleaning procedure is recommended for Test Method D 877.

D 92 Test Method for Flash and Fire Points by Cleveland Open Cup⁴

D 97 Test Method for Pour Point of Petroleum Products⁴

D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)⁴

D 877 Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes⁵

D 923 Test Methods for Sampling Electrical Insulating Liquids⁵

D 924 Test Method for Dissipation Factor (or Power Factor) and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids⁵

D 974 Test Method for Acid and Base Number by Color-Indicator Titration⁴

D 1169 Test Method for Specific Resistance (Resistivity) of Electrical Insulating Liquids⁵

D 1298 Practice for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method⁴

D 1481 Test Method for Density and Relative Density (Specific Gravity) of Viscous Materials by Lipkin Bicapillary Pycnometer⁴

D 1533 Test Methods for Water in Insulating Liquids (Karl Fischer Reaction Method)⁵

D 1807 Test Methods for Refractive Index and Specific Optical Dispersion of Electrical Insulating Liquids⁵

D 2129 Test Method for Color of Water White Electrical Insulating Liquids⁵

D 2161 Practice for Conversion of Kinematic Viscosity to Saybolt Universal Viscosity or to Saybolt Furol Viscosity⁴

D 2864 Terminology Relating to Electrical Insulating Liquids and Gases⁵

D 4052 Test Method for Density and Relative Density of Liquids by Digital Density Meter⁶

D 4059 Test Method for Analysis of Polychlorinated Biphenyls in Insulating Liquids by Gas Chromatography⁵

D 4559 Test Method for Volatile Matter in Silicone Fluid⁵

D 4652 Specification for Silicone Fluid Used for Electrical Insulation⁵

D 5282 Test Methods for Compatibility of Construction

⁴ *Annual Book of ASTM Standards*, Vol 05.01.

⁵ *Annual Book of ASTM Standards*, Vol 10.03.

⁶ *Annual Book of ASTM Standards*, Vol 05.02.