



Standard Specification for Mineral Insulating Oil Used in Electrical Apparatus¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers new mineral insulating oil of petroleum origin for use as an insulating and cooling medium in new and existing power and distribution electrical apparatus, such as transformers, regulators, reactors, circuit breakers, switchgear, and attendant equipment.

1.2 This specification is intended to define a mineral insulating oil that is functionally interchangeable and miscible with existing oils, is compatible with existing apparatus and with appropriate field maintenance,² and will satisfactorily maintain its functional characteristics in its application in electrical equipment. This specification applies only to new insulating oil as received prior to any processing.

2. Referenced Documents

2.1 ASTM Standards:

- D 88 Test Method for Saybolt Viscosity³
- 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 Liquids⁴
- D 611 Test Methods for Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents⁴
- D 877 Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes⁵
- D 923 Test Method 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 971 Test Method for Interfacial Tension of Oil Against Water by the Ring Method⁵

- D 974 Test Method for Acid and Base Number by Color-Indicator Titration⁴
- D 1275 Test Method for Corrosive Sulfur in Electrical Insulating Oils⁵
- D 1298 Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method^{4,5}
- D 1500 Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)⁴
- D 1524 Test Method for Visual Examination of Used Electrical Insulating Oils of Petroleum Origin in the Field⁵
- D 1533 Test Methods for Water in Insulating Liquids (Karl Fischer Reaction Method)⁵
- D 1816 Test Method for Dielectric Breakdown Voltage of Insulating Oils of Petroleum Origin Using VDE Electrodes⁵
- D 1903 Test Method for Coefficient of Thermal Expansion of Electrical Insulating Liquids of Petroleum Origin, and Askarels⁵
- D 2112 Test Method for Oxidation Stability of Inhibited Mineral Insulating Oil by Rotating Bomb⁵
- D 2300 Test Method for Gassing of Insulating Oils Under Electrical Stress and Ionization (Modified Pirelli Method)⁵
- D 2440 Test Method for Oxidation Stability of Mineral Insulating Oil⁵
- D 2668 Test Method for 2,6-Ditertiary-Butyl Para-Cresol and 2,6-Ditertiary-Butyl Phenol in Electrical Insulating Oil by Infrared Absorption⁵
- D 2717 Test Method for Thermal Conductivity of Liquids⁶
- D 2766 Test Method for Specific Heat of Liquids and Solids⁶
- D 3300 Test Method for Dielectric Breakdown Voltage of Insulating Oils of Petroleum Origin Under Impulse Conditions⁵
- D 4059 Test Method for Analysis of Polychlorinated Biphenyls in Insulating Liquids by Gas Chromatography⁵
- D 4768 Test Method for Analysis of 2,6-Ditertiary-Butyl Para-Cresol and 2,6-Ditertiary-Butyl Phenol in Insulating Fluids by Gas Chromatography⁵
- D 5837 Test Method for Furanic Compounds in Electrical Insulating Liquids by High Performance Liquid Chromatography (HPLC)⁵

¹ This specification is under the jurisdiction of ASTM Committee D27 on Electrical Insulating Liquids and Gases and is the direct responsibility of Subcommittee D27.01 on Mineral.

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² Refer to American National Standard C 57.106. Guide for Acceptance and Maintenance of Insulating Oil in Equipment (IEEE Standard 64). Available from the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.

³ Annual Book of ASTM Standards, Vol 04.04.

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.