



Standard Specification for High Fire-Point Mineral Electrical Insulating Oils¹

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1. Scope

1.1 This specification describes a high fire-point mineral oil based insulating fluid, for use as a dielectric and cooling medium in new and existing power and distribution electrical apparatus, such as transformers and switchgear.

1.2 High fire-point insulating oil differs from conventional mineral insulating oil by possessing a fire-point of at least 300°C. High fire-point mineral insulating oils are also referred to as “less flammable” mineral insulating oils. This property is necessary in order to comply with certain application requirements of the National Electrical Code (Article 450-23) or other agencies. The material discussed in this specification is miscible with other petroleum based insulating oils. Mixing high fire-point liquids with lower fire point hydrocarbon insulating oils (for example, Specification D 3487 mineral oil) may result in fire points of less than 300°C.

1.3 This specification is intended to define a high fire-point electrical mineral insulating oil that is compatible with typical material of construction of existing apparatus and will satisfactorily maintain its functional characteristic in its application in this application. The material described in this specification may not be miscible with electrical insulating liquids of non-petroleum origin. The user should contact the manufacturer of the high fire-point insulating oil for guidance in this respect.

1.4 This specification applies only to new insulating material oil as received prior to any processing. Information on in-service maintenance testing is available in appropriate guides.² The user should contact the manufacturers of the equipment or oil if questions of recommended characteristics or maintenance procedures arise.

2. Referenced Documents

2.1 ASTM Standards:

- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup³
- D 97 Test Method for Pour Point of Petroleum Products³

¹ This specification is under the jurisdiction of ASTM Committee D-27 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 C57.121 IEEE Guide for Acceptance and Maintenance of Less Flammable Hydrocarbon Fluid in Transformers.

³ Annual Book of ASTM Standards, Vol 05.01.

- D 117 Guide to Sampling Test Methods and Standard Practices for Electrical Insulating Oils of Petroleum Origin⁴
- D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids³
- D 611 Test Methods for Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents³
- D 664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration³
- D 877 Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes⁴
- D 878 Test Method for Inorganic Chlorides and Sulfates in Insulating Oils⁴
- D 923 Practices for Sampling Electrical Insulating Liquids⁴
- D 924 Test Method for Dissipation Factor (or Power Factor) and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids⁴
- D 971 Test Method for Interfacial Tension of Oil Against Water by the Ring Method⁴
- D 974 Test Method for Acid and Base Number by Color-Indicator Titration³
- D 1275 Test Method for Corrosive Sulfur in Electrical Insulating Oils⁴
- D 1298 Practice for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method³
- D 1500 Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)³
- D 1524 Test Method for Visual Examination of Used Electrical Insulating Oils of Petroleum Origin in the Field⁴
- D 1533 Test Methods for Water in Insulating Liquids (Karl Fischer Method)⁴
- D 2112 Test Method for Oxidation Stability of Inhibited Mineral Insulating Oil by Rotating Bomb⁴
- D 2300 Test Method for Gassing of Insulating Oils Under Electrical Stress and Ionization (Modified Pirelli Method)⁴
- D 2440 Test Method for Oxidation Stability of Mineral Insulating Oil⁴
- D 2668 Test Method for 2,6-Ditertiary-Butyl Para-Cresol and 2,6-Ditertiary-Butyl Phenol in Electrical Insulating Oil by Infrared Absorption⁴
- D 2864 Terminology Relating to Electrical Insulating Liquids and Gases⁴
- D 3487 Specification for Mineral Insulating Oil Used in

⁴ Annual Book of ASTM Standards, Vol 10.03.

