



Designation: D 2283 – 86 (Reapproved 1997)

Standard Specification for Chlorinated Aromatic Hydrocarbons (Askarels) for Transformers¹

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1. Scope

1.1 This specification covers synthetic nonflammable electrical insulating liquids of the chlorinated aromatic hydrocarbon-type known as askarels, which are used as an insulating and cooling medium in liquid-filled transformers. This specification includes liquids that were previously available and are still in use in apparatus.

1.2 Askarels covered by this specification are of various types, having components in weight percent in accordance with Table 1.

NOTE 1—The components and the respective percentages given are descriptive of the materials currently in common use and are not intended as part of this specification, which is based on physical and chemical properties.

NOTE 2—Types A through G are PCB-type askarels previously available and still in use in the field. Recently Type H, a non-PCB askarel, was introduced as a retrofit and replacement.

NOTE 3—Current governmental regulations prohibit the manufacture and sale of polychlorinated biphenyls (PCBs). This method serves as a reference for all askarels, PCB and non-PCB.

2. Referenced Documents

2.1 ASTM Standards:

- D 88 Test Method for Saybolt Viscosity²
- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup³
- D 97 Test Method for Pour Point of Petroleum Products³
- D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)³
- 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 923 Test Method for Sampling Electrical Insulating Liquids⁴

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 D27.02 on Gases and Synthetic Liquids.

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² Annual Book of ASTM Standards, Vol 04.04.

³ Annual Book of ASTM Standards, Vol 05.01.

⁴ Annual Book of ASTM Standards, Vol 10.03.

- D 924 Test Method for Dissipation Factor (or Power Factor) and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids⁴
- D 974 Test Method for Acid and Base Number by Color-Indicator Titration³
- D 1169 Test Method for Specific Resistance (Resistivity) of Electrical Insulating Liquids⁴
- D 1218 Test Method for Refractive Index and Refractive Dispersion of Hydrocarbon Liquids³
- D 1533 Test Methods for Water in Insulating Liquids (Karl Fischer Reaction Method)⁴
- D 1701 Test Methods for Scavenger Content of Askarels⁴
- D 1810 Test Method for Specific Gravity of Askarels⁴
- D 1821 Test Method for Inorganic Chlorides in Askarels⁴
- D 1903 Test Method for Coefficient of Thermal Expansion of Electrical Insulating Liquids of Petroleum Origin, and Askarels⁴
- D 2129 Test Method for Color of Water White Electrical Insulating Liquids⁴

3. Terminology

3.1 Definition:

3.1.1 *askarel*—a generic term for a group of synthetic, fire-resistant, chlorinated aromatic hydrocarbons used as electrical insulating liquids. They have a property under arcing conditions such that any gases produced will consist predominantly of noncombustible hydrogen chloride with lesser amounts of combustible gases.

4. Detail Requirements

4.1 Askarels for use in transformers shall conform to the requirements prescribed in Table 2.

NOTE 4—If more convenient, a measurement of dissipation factor may be made by Test Method D 924 in place of the resistivity measurement. Theoretical considerations indicate and experiment confirms that a strong statistical correlation exists between the dissipation factor and resistivity; however, other factors modify in practice the precise relationship predicted by theory. A dissipation factor at 60 Hz and 100°C that is not in excess of 15 % shall be considered satisfactory.

5. Sampling and Test Methods

5.1 Sample the material in accordance with Test Method D 923, and tests shall be conducted in accordance with the test methods listed in Table 2.