



Standard Test Method for Chlorine Content of Polybutenes Used for Electrical Insulation¹

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1. Scope

1.1 This test method describes the determination of the total chloride content of polybutenes used for electrical insulation.

1.2 *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.* For specific hazards information, see Section 8.

2. Referenced Documents

2.1 ASTM Standards:

D 878 Test Method for Inorganic Chlorides and Sulfates in Insulating Oils²

D 1193 Specification for Reagent Water³

D 2296 Specification for Continuity of Quality of Electrical Insulating Polybutene Oil for Capacitors²

3. Summary of Test Method

3.1 Organically bound chlorine is converted into sodium chloride by reaction with sodium biphenyl solution. The sodium chloride formed is extracted with dilute nitric acid, and the chlorine content of the aqueous phase is determined by potentiometric titration.

4. Significance and Use

4.1 Chlorine is normally present in polybutenes in small amounts, usually below 50 ppm, as organically bound chlorine. Inorganic chloride is normally not present.

NOTE 1—The qualitative presence or absence of inorganic chloride may be tested by Test Method D 878.

5. Interferences

5.1 The presence of substances which form insoluble silver compounds, such as sulfides, will give high results. Such substances are not normally present in polybutenes.

¹ This test method is under the jurisdiction of ASTM Committee D-27 on Electrical Insulating Liquids and Gases and is the direct responsibility of Subcommittee D27.06 on Chemical Test.

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² *Annual Book of ASTM Standards*, Vol 10.03.

³ *Annual Book of ASTM Standards*, Vol 11.01.

6. Apparatus

6.1 *Separatory Funnel*, 250-mL.

6.2 *Potentiometric Titrimeter*, automatic recording, or manual.

6.3 *Electrodes*:

6.3.1 Silver and glass electrode combination is preferred.

6.3.2 A silver electrode with a mercurous sulfate reference electrode is an acceptable alternative.

6.4 *Microburet*, 5-mL, with 0.01-mL divisions.

7. Reagents

7.1 *Purity of Reagents*—Use reagent grade chemicals in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.⁴ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

7.2 *Purity of Water*— Unless otherwise indicated, references to water shall be understood to mean reagent grade water as defined by Type I conforming to Specifications D 1193.

7.3 *Dilute Nitric Acid (2.1 M)*—Dilute 134 mL of concentrated nitric acid to 1.0 L with water.

7.4 *Isopropyl Alcohol*.

7.5 *Silver Nitrate, Standard Solution (0.025 N)*—Weigh accurately 0.4247 g of silver nitrate (AgNO_3). Transfer it to a 1-L volumetric flask and add water to dissolve. Add 3.0 mL of concentrated nitric acid (HNO_3 , relative density (specific gravity) 1.42) and then add water to the 1-L mark of the volumetric flask. Standardize this solution against a pure chloride standard. Check the solution at least monthly to assure a constant reagent.

7.6 *Sodium Chloride*, NIST Standard Reference Material 919A.

NOTE 2—Dry the silver nitrate overnight in a desiccator before making up the solution. Both the solid material and the solution must be protected from light by storage in brown glassware in the dark.

⁴ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.