



Standard Test Method for Acidity of Sulfur Hexafluoride¹

This standard is issued under the fixed designation D2284; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of the acidic fluorides of sulfur hexafluoride (SF_6).

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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*:²
D1193 Specification for Reagent Water

3. Summary of Test Method

3.1 Acidic constituents of the sample are absorbed in slightly alkaline water containing an indicator and the excess base titrated with a standard acid solution. The resultant acidity is expressed as equivalents of hydrofluoric acid (HF).

4. Significance and Use

4.1 Acidic fluorides are undesirable in SF_6 used as an electrical insulating gas in that they may contribute to corrosion or constitute dielectric hazard.

4.2 This test method is valid for both new and used SF_6 . In used SF_6 , it will only measure those active species which are hydrolyzable.

5. Apparatus

- 5.1 *Gas Washing Bottles*, 500-mL capacity, two required.
5.2 *Microburet*, graduated to 0.01 mL.

5.3 Wet Test Meter.

NOTE 1—The meter is used to measure the volume of dry gas in liters and hence the weight of SF_6 samples. The density of sulfur hexafluoride at 0°C and 1 atm. of pressure (STP) is 6.52 g/L. The density of sulfur hexafluoride at 25°C and 1 atm. of pressure (normal temperature and pressure) is 5.97 g/L. Alternatively, the sample weight may be determined by weighing the sample cylinder before and after sampling.

6. Reagents

6.1 *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.³ 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.

6.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent grade water conforming to Specification **D1193**.

6.3 *Phenolphthalein Indicator Solution (10 g/L)*—Dissolve 1 g of phenolphthalein in 100 mL of ethanol (95 %).

6.4 *Sodium Hydroxide Solution (0.01 N)*—Dissolve 0.4 ± 0.01 g of sodium hydroxide (NaOH) in water and dilute to 1 L. Prepare a fresh solution weekly. Standardize by titrating against a weighed amount of potassium acid phthalate.

6.5 *Sulfuric Acid (0.01 N)*—Add 0.25 mL of concentrated sulfuric acid (H_2SO_4 , sp gr 1.84) to water and dilute to 1 L. Standardize against standard 0.01 N NaOH solution.

7. Sampling

7.1 Take the sample as a liquid from the cylinder to be sampled. This may be done by inverting the cylinder so that the outlet valve is at the bottom.

8. Preparation of Apparatus

8.1 Place the cylinder to be sampled as suggested in Section 7 and connect a needle valve to the cylinder outlet. Connect the

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

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² The boldface numbers in parentheses refer to a list of references at the end of this standard.

³ *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 *Annual Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.