



Designation: D2685 – 11 (Reapproved 2019)

Standard Test Method for Air and Carbon Tetrafluoride in Sulfur Hexafluoride by Gas Chromatography¹

This standard is issued under the fixed designation D2685; 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 air (**Note 1**) and carbon tetrafluoride as impurities in sulfur hexafluoride.

NOTE 1—Nitrogen, oxygen, or any of their mixtures is considered to be air. Commercial grade air or nitrogen is used for standardization.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D2472 Specification for Sulfur Hexafluoride

E260 Practice for Packed Column Gas Chromatography

E355 Practice for Gas Chromatography Terms and Relationships

3. Summary of Test Method

3.1 Air and carbon tetrafluoride are separated physically by gas chromatography and compared to corresponding components separated under similar conditions from a reference standard mixture of known composition. The individual com-

pounds of air are not separated. The composition of the sample is calculated from its chromatogram by comparing the area of the peak of each component with the area of the peak of the corresponding component on the reference standard chromatogram.

4. Significance and Use

4.1 Air and carbon tetrafluoride (CF_4) are two contaminants of interest in sulfur hexafluoride (SF_6). Both of these contaminants adversely affect the performance of SF_6 when used as an electrical insulating gas. Specification for maximum levels of these contaminants are given in Specification **D2472**.

4.2 Gas chromatography is used to separate these contaminants from a sample of SF_6 and to determine their concentration.

5. Apparatus

5.1 *Gas Chromatograph*, consisting of a sample inlet system, adsorption column, flow meter, detector, and data handling system. Ensure that the column material of construction and sample components are compatible. The apparatus must completely separate air, carbon tetrafluoride, and sulfur hexafluoride as indicated by return of the recorded peak to the base line between each successive peak. Chromatograms must be reproducible so that successive runs of a reference standard agree on each component peak area or height within 5 %. For additional information on gas chromatography see Practices **E260** and **E355**.

6. Reagents and Materials

6.1 *Cylinder of Helium Gas.*

6.2 *Reference Standard Mixture*—A gas mixture that contains known percentages of air and carbon tetrafluoride in helium or air and carbon tetrafluoride in sulfur hexafluoride is required. The concentration of a component in the reference sample should not be less than 50 % nor more than 300 % of the concentration of the corresponding component in the unknown.

7. Calibration and Standardization

7.1 *Apparatus Preparation*—Prepare the gas chromatograph for use as directed by the manufacturer. The following operating conditions have been found satisfactory. However, any

¹ This test method is under the jurisdiction of ASTM Committee D27 Electrical Insulating Liquids and Gases and is the direct responsibility of Subcommittee D27.03 on Analytical Tests.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.