



Designation: D3270 – 13 (Reapproved 2021)

Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method)¹

This standard is issued under the fixed designation D3270; 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 These test methods describe the semiautomated procedure for the analyses of various types of samples for the purpose of determining total fluoride. Since the test methods incorporate microdistillation of the sample, they may be applied to any fluoride-containing solution where standards of identical composition have been carried through the same sample preparation procedures and have proven to provide quantitative recovery when analyzed by the semiautomated system. Conversely, the methods shall not be applied for analyses until the applicability has been demonstrated.

1.2 In normal use, the procedure can detect 0.1 $\mu\text{g/mL}$ of F. The normal range of analysis is from 0.1 to 1.6 $\mu\text{g/mL}$ of F. Higher concentrations can be analyzed by careful dilution of samples with reagent water. If digested samples routinely exceed 1.6 $\mu\text{g/mL}$ of F, the analytical portion of the pump manifold can be modified to reduce sensitivity. However, the best procedure is to analyze a smaller aliquot of the sample. Most accurate results are obtained when the fluoride concentration falls in the middle or upper part of the calibration curve.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.4 *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. See 8.3, 10.2.4, and 10.2.5 for additional precautions.*

1.5 *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.*

¹ These test methods are under the jurisdiction of ASTM Committee D22 on Air Quality and are the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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2. Referenced Documents

2.1 *ASTM Standards:*²

D1193 Specification for Reagent Water

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D3266 Test Method for Automated Separation and Collection of Particulate and Acidic Gaseous Fluoride in the Atmosphere (Double Paper Tape Sampler Method)

D3267 Test Method for Separation and Collection of Particulate and Water-Soluble Gaseous Fluorides in the Atmosphere (Filter and Impinger Method)

D3268 Test Method for Separation and Collection of Particulate and Gaseous Fluorides in the Atmosphere (Sodium Bicarbonate-Coated Glass Tube and Particulate Filter Method)

D3269 Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Manual Procedures) (Withdrawn 2010)³

D3614 Guide for Laboratories Engaged in Sampling and Analysis of Atmospheres and Emissions

3. Terminology

3.1 *Definitions*—For definitions of terms used in these methods, see Terminology D1356.

4. Summary of Test Methods

4.1 These semiautomated methods are based on the distillation of hydrogen fluoride (HF) from the sample and subsequent reaction of the distillate with alizarin fluorine blue-lanthanum nitrate reagent, to form a blue complex which is measured colorimetrically at 624 nm (**1**),⁴ or the subsequent measurement with a specific ion probe.

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.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ The boldface numbers in parentheses refer to the references at the end of this method.