



Standard Practice for Planning the Sampling of the Ambient Atmosphere¹

This standard is issued under the fixed designation D 1357; 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 The purpose of this practice is to present the broad concepts of sampling the ambient air for the concentrations of contaminants. Detailed procedures are not discussed. General principles in planning a sampling program are given including guidelines for the selection of sites and the location of the air sampling inlet.

1.2 Investigations of atmospheric contaminants involve the study of a heterogeneous mass under uncontrolled conditions. Interpretation of the data derived from the air sampling program must often be based on the statistical theory of probability. Extreme care must be observed to obtain measurements over a sufficient length of time to obtain results that may be considered representative.

1.3 The variables that may affect the contaminant concentrations are the atmospheric stability (temperature-height profile), turbulence, wind speed and direction, solar radiation, precipitation, topography, emission rates, chemical reaction rates for their formation and decomposition, and the physical and chemical properties of the contaminant. To obtain concentrations of gaseous contaminants in terms of weight per unit volume, the ambient temperature and atmospheric pressure at the location sampled must be known.

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

2. Referenced Documents

2.1 ASTM Standards:

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres²

D 3249 Practice for General Ambient Air Analyzer Procedures²

D 3614 Guide for Laboratories Engaged in Sampling and Analysis of Atmospheres and Emissions²

NOTE 1—A list of references are appended to this practice which

¹ This practice is under the jurisdiction of ASTM Committee D22 on Sampling and Analysis of Atmospheres and is the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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² *Annual Book of ASTM Standards*, Vol 11.03.

provide greater details including background information, air quality modeling techniques, and special purposes air sampling programs **(1)**.³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminology D 1356.

4. Summary of Practice

4.1 This practice describes the general guidelines in planning for sampling the ambient air for the concentrations of contaminants.

5. Significance and Use

5.1 Since the analysis of the atmosphere is influenced by phenomena in which all factors except the method of sampling and analytical procedure are beyond the control of the investigator, statistical consideration must be given to determine the adequacy of the number of samples obtained, the length of time that the sampling program is carried out, and the number of sites sampled. The purpose of the sampling and the characteristics of the contaminant to be measured will have an influence in determining this adequacy. Regular, or if possible, continuous measurements of the contaminant with simultaneous pertinent meteorological observations should be obtained during all seasons of the year. Statistical techniques may then be applied to determine the influence of the meteorological variables on the concentrations measured **(2)**.

5.2 Statistical methods may be used for the interpretation of all of the data available **(2)**. Trends of patterns and relationships between variables of statistical significance may be detected. Much of the validity of the results will depend, however, on the comprehensiveness of the analysis and the location and contaminant measured. For example, if 24-h samples of suspended particulate matter are obtained only periodically (for example, every 6 or 8 days throughout the year), the geometric mean of the measured concentrations is representative of the median value assuming the data are log normally distributed. The geometric mean level may be used to compare the air quality at different locations at which such regular but intermittent observations of suspended particulate matter are made.

³ The boldface numbers in parentheses refer to the list of references at the end of this practice.