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## Standard Guide for Statistical Evaluation of Atmospheric Dispersion Model Performance<sup>1</sup>

This standard is issued under the fixed designation D6589; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope

1.1 This guide provides techniques that are useful for the comparison of modeled air concentrations with observed field data. Such comparisons provide a means for assessing a model's performance, for example, bias and precision or uncertainty, relative to other candidate models. Methodologies for such comparisons are yet evolving; hence, modifications will occur in the statistical tests and procedures and data analysis as work progresses in this area. Until the interested parties agree upon standard testing protocols, differences in approach will occur. This guide describes a framework, or philosophical context, within which one determines whether a model's performance is significantly different from other candidate models. It is suggested that the first step should be to determine which model's estimates are closest on average to the observations, and the second step would then test whether the differences seen in the performance of the other models are significantly different from the model chosen in the first step. An example procedure is provided in [Appendix X1](#) to illustrate an existing approach for a particular evaluation goal. This example is not intended to inhibit alternative approaches or techniques that will produce equivalent or superior results. As discussed in Section 6, statistical evaluation of model performance is viewed as part of a larger process that collectively is referred to as model evaluation.

1.2 This guide has been designed with flexibility to allow expansion to address various characterizations of atmospheric dispersion, which might involve dose or concentration fluctuations, to allow development of application-specific evaluation schemes, and to allow use of various statistical comparison metrics. No assumptions are made regarding the manner in which the models characterize the dispersion.

1.3 The focus of this guide is on end results, that is, the accuracy of model predictions and the discernment of whether differences seen between models are significant, rather than

operational details such as the ease of model implementation or the time required for model calculations to be performed.

1.4 This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This guide cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this guide may be applicable in all circumstances. This guide is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should it be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this guide means only that the document has been approved through the ASTM consensus process.

1.5 This standard applies to gaussian plume models; it may not be applicable to non-point sources, heavy gas models from evaporation from pool (for example, liquid spills), as well as near-field receptors.

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

1.7 *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.*

1.8 *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:*<sup>2</sup>

[D1356 Terminology Relating to Sampling and Analysis of Atmospheres](#)

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.11 on Meteorology.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

# Sampling And Calibration For Atmospheric Measurements Astm Special Technical Publication No 957

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□□□□□□□□ (Japan),1900      1989 ASHRAE Handbook American Society of Heating, Refrigerating and Air-Conditioning Engineers,1989      **The Human Equation** ,1989      *Qualitative and Quantitative Assessment of Fungi Associated with Wood Chip Fuel Piles* K. E. Hellenbrand,Canada Centre for Mineral and Energy Technology. Efficiency and Alternative Energy Technology Branch,1990 The emerging use of wood chips as an alternate energy source has led to an increase in the number of wood chip piles in domestic and institutional environments Depending on the type of wood used and the harvesting handling and storage conditions fuel wood chips have been found to support growth of a wide range of microorganisms particularly fungi many of which are toxic or pathogenic This report gathers existing information on determining microorganisms in indoor air for potential hazards posed by wood chip storage and presents recommendations for the safe handling and storage of wood chips in indoor environments      Special Publication ,1980      *Forthcoming Books* Rose Army,1988-07      **Bibliographic Guide to Conference Publications** New York Public Library. Research Libraries,1987 Vols for 1975 include publications cataloged by the Research Libraries of the New York Public Library with additional entries from the Library of Congress MARC tapes      Directory of Published Proceedings ,1984      Books in Series, 1876-1949 R.R. Bowker Company,1982      Scientific and Technical Books and Serials in Print ,1989      American Book Publishing Record ,1987      **Government Reports Announcements & Index** ,1991      Books in Print ,1977

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