



Standard Guide for Using Probability Sampling Methods in Studies of Indoor Air Quality in Buildings¹

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^{ε1} NOTE—Reapproved with editorial changes in April 2012.

1. Scope

1.1 This guide covers criteria for determining when probability sampling methods should be used to select locations for placement of environmental monitoring equipment in a building or to select a sample of building occupants for questionnaire administration for a study of indoor air quality. Some of the basic probability sampling methods that are applicable for these types of studies are introduced.

1.2 Probability sampling refers to statistical sampling methods that select units for observation with known probabilities (including probabilities equal to one for a census) so that statistically defensible inferences are supported from the sample to the entire population of units that had a positive probability of being selected into the sample.

1.3 This guide describes those situations in which probability sampling methods are needed for a scientific study of the indoor air quality in a building. For those situations for which probability sampling methods are recommended, guidance is provided on how to implement probability sampling methods, including obstacles that may arise. Examples of their application are provided for selected situations. Because some indoor air quality investigations may require application of complex, multistage, survey sampling procedures and because this standard is a guide rather than a practice, the references in [Appendix X1](#) are recommended for guidance on appropriate probability sampling methods, rather than including expositions of such methods in this guide.

1.4 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

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

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, refer to Terminology [D1356](#).

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *census*—survey of all elements of the target population.

3.2.2 *cluster sample*—a sample in which the sampling frame is partitioned into disjoint subsets called clusters and a sample of the clusters is selected.

3.2.2.1 *Discussion*—Data may be collected for all units in each sample cluster or, when a multistage sample is being selected, the units within the sampled clusters may be further subsampled.

3.2.3 *compositing samples*—physically combining the material collected in two or more environmental samples.

3.2.4 *expected value*—the average value of a sample statistic over all possible samples that could be selected using a specified sample selection procedure.

3.2.5 *multistage sample*—a sample selected in stages such that larger units are selected at the first stage, and smaller units are selected at each subsequent stage from within the units selected at the previous stage of sampling.

3.2.5.1 *Discussion*—For assessing the indoor air quality in a population of office buildings, individual buildings might be selected at the first stage of sampling, floors selected within

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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.