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# Standard Terminology Relating to Sampling[1]

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## 1. Scope

1.1 This terminology covers those items related to statistical aspects of sampling.

## 2. Referenced Documents

2.1 *ASTM Standards:*

E 105 Practice for Probability Sampling of Materials[2]

E 456 Terminology Relating to Quality and Statistics[2]

## 3. Significance and Use

3.1 This terminology standard is a subsidiary to Terminology E 456.

3.2 It provides definitions, descriptions, discussions, and comparison of terms.

## 4. Terminology

**acceptance quality limit (AQL),** *n*— quality level that is the worst tolerable process average when a continuing series of lots is submitted for acceptance sampling.

DISCUSSION—This concept only applies when a sampling scheme with rules for switching and discontinuation such as in ISO 2859-1 or ISO 3951 is used. Although individual lots with quality as bad as the acceptance quality limit may be accepted with fairly high probability, the designation of an acceptance quality limit does not suggest that this is a desirable quality level. Sampling schemes found in international standards such as ISO 2859-1, with their rules for switching and discontinuation of sampling inspection, are designed to encourage suppliers to have process averages consistently better than AQL. Otherwise, there is a high risk that the inspection severity will be switched to tightened inspection, under which the criteria for lot acceptance become more demanding. Once on tightened inspection, unless action is taken to improve the process, it is very likely that the rule requiring discontinuation of sampling inspection pending such improvement will be invoked.

**cluster sampling,** *n*— when the primary sampling unit comprises a bundle of elementary units or a group of subunits, the term cluster sampling may be applied.

DISCUSSION—Examples of cluster sampling are: selection of city blocks as primary sampling units; selection of a household as a cluster of people (of which only one may be interviewed); selection of a bundle of rods or pipe from a shipment; and selection, from a shipment of cartons that contain boxes or packages within them.

**double sampling,** *n*—a form of multi-phase sampling, in which there are only two phases. See **phase**.

**draw,** *n*—a term used in sample selection. See **step**.

**final sample,** *n*—sample obtained at the final stage of multi-stage sampling.

**multi-stage sampling, nested sampling**— sampling in which the sample is selected by stages, the sampling units at each stage being from the larger sampling units chosen at the previous stage.

NOTE 1—Multi-stage sampling is different from multiple sampling. (see **acceptance sampling**).

**primary sampling unit,** *psu*, *n*—the element, increment, segment or cluster selected at the first stage of the selection procedure from a population or universe.

DISCUSSION—This concept requires that the universe (or population) has been divided into a discrete set of sampling units or can be so divided in the process of selecting the sample. Examples are cartons of a lot or shipment, bales of wool or jute, and units created in moving a bulk material such as coal or sand. These units are designated as the primary sampling units, which may be subsampled at further stages of the sampling procedure.

**probability sample,** *n*—a sample of which the sampling units have been selected by a chance process such that, at each step of selection, a specified probability of selection can be attached to each sampling unit available for selection.

DISCUSSION—These probabilities of selection need not be equal, Also, see Practice E 105 in this volume.

**proportional sampling,** *n*—a method of selection such that the proportion of the sampling units (usually, psu's) selected for the sample from each stratum is the same (except for possible rounding effects).

DISCUSSION—The procedure for proportional sampling is to select a sample from each stratum of a stratified universe (or population) such that (except for possible rounding effects):

$$n \text{ sub } 1/N \text{ sub } 1 = n \text{ sub } 2/N \text{ sub } 2 = n \text{ sub } g/N \text{ sub } g,$$

where:

$n$ sub $i$ = the sample size, and

[1] This terminology is under the jurisdiction of ASTM Committee E11 on Quality and Statistics and is the direct responsibility of Subcommittee E11.70 on Editorial/Terminology.

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[2] *Annual Book of ASTM Standards*, Vol 14.02.