

18.3.4 Sample types

Random sample

The sample so selected that any portion of the population has an equal (or known) chance of being chosen.

Note: Haphazard or arbitrary choice of units is generally insufficient to guarantee randomness.

Representative sample

A sample resulting from a sampling plan that can be expected to adequately reflect the properties of interest of the parent population.

Note: A representative sample may be a random sample or, for example, a stratified sample, depending upon the objective of sampling and the characteristics of the population. The degree of representativeness of the sample may be limited by cost or convenience.

Selective sample

A sample that is deliberately chosen by using a sampling plan that screens out materials with certain characteristics and/or selects only material with other relevant characteristics.

Stratified sample

A sample consisting of portions obtained from identified subparts (strata) of the parent population. Within each stratum, the samples are taken randomly.

Note: The objective of taking stratified samples is to obtain a more representative sample than that which might otherwise be obtained by random sampling.

Convenience sample

A sample chosen on the basis of accessibility, expediency, cost, efficiency, or other reason not directly concerned with sampling parameters.

Umpire sample/referee sample/reserve sample

A sample taken, prepared, and stored in an agreed upon manner for the purpose of settling a dispute.

Notes:

- (1) The agreement usually extends beyond the sample to the basis for reaching a decision (e.g., quantity of material from which taken, use of a third party, and criteria serving as the basis for acceptance, rejection, or economic adjustment).
- (2) The term "Reference Sample" has been used in this context but this term more properly should be used in conjunction with a "Reference Material" or "Reference Standard" which has a true or assigned value for a constituent or property. One of the characteristics of a reference material or reference standard is that it must have a negligible sampling error between test portions.

Replicate (duplicate) sample

Multiple (or two) samples taken under comparable conditions. This selection may be accomplished by taking units adjacent in time or space.

Notes:

- (1) Although the replicate samples are expected to be identical, often the only thing replicated is the act of taking the physical sample.
- (2) A duplicate sample is a replicate sample consisting of two portions.
- (3) The *umpire sample* is usually used to settle a dispute; the replicate sample is usually used to estimate sample variability.

Sequential sample

Units, increments, or samples taken one at a time or in successive predetermined groups, until the cumulative result of their measurements (typically applied to attributes), as assessed against predetermined limits, permits a decision to accept or reject the population or to continue sampling. The number of observations required is not determined in advance, but the decision to terminate the operation depends, at each stage, on the results of the previous observations. The plan may have a practical, automatic termination after a certain number of units have been examined.

Multistage sampling

Samples taken in a series of steps with the sampling portions constituting the sample (units or increments) at each step being selected from the larger or greater number of portions of the previous step, or from a *primary* or *composite sample*.

Note: The first set of portions (units or increments) taken from the population available for sampling is the primary sample. The subsequent samples (secondary, tertiary, etc.) are the sets of subsamples, units, items, individuals, or increments taken from the preceding step. The units may be different at different steps of multistage sampling (e.g., pallets, cases, packages).

Combined sample

A sample obtained by removing specific fractions by separation or selection techniques (e.g., heavy liquid, magnetic, sieving, etc.), analysing the fractions separately, and combining the results mathematically.

Notes:

- (1) When not combined, the sample is a *modified sample*.
- (2) This term should not be confused with *composite sample*. (For composite sample see Note 1 after *increment* in 18.3.6.)

Modified sample

A sample or a known fraction of the parent population in which the analyte has been isolated or (usually) concentrated before being submitted to the laboratory.

Note: If the isolation or concentration occurs in the laboratory, the procedure is usually considered part of the preparation of the test sample from the laboratory sample (in-laboratory processing).