

18.4.2 Analytical techniques, methods and the measurement process

Methods of chemical analysis can range from rather loosely specified adaptations of basic analytical techniques to explicitly defined test methods that meet the needs of regulatory agencies. Important terminology has been developed, however, to characterize analytical methods from the perspective of precision and accuracy.

Definitive Method

A method of exceptional scientific status which is sufficiently accurate to stand alone in the determination of a given property for the *Certification of a Reference Material* (See section 18.8). Such a method must have a firm theoretical foundation so that systematic error is negligible relative to the intended use. Analyte masses (amounts) or concentrations must be measured directly in terms of the base units of measurements, or indirectly related through sound theoretical equations. Definitive methods, together with Certified Reference Materials, are primary means for transferring accuracy -- i.e., establishing *traceability*.

Note: **Traceability** is defined as "the property of a result or measurement whereby it can be related to appropriate standards, generally international or national standards, through an unbroken chain of comparisons" (See section 18.8).

Reference Method

A method having small, estimated inaccuracies relative to the end use requirement. The accuracy of a reference method must be demonstrated through direct comparison with a Definitive Method or with a primary Reference Material.

Chemical Measurement Process (CMP)

An analytical method of defined structure that has been brought into a state of statistical control, such that its imprecision and bias are fixed, given the measurement conditions. This is prerequisite for the evaluation of the Performance Characteristics of the method, or the development of meaningful uncertainty statements concerning analytical results.