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Standard Terminology Relating to Performance Validation in Thermal Analysis[1]

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1. Scope

1.1 Validation of methods and apparatus is requested or required for quality initiatives or where results may be used for legal purposes.

1.2 This standard provides terminology relating to validating performance of thermal analysis methods and instrumentation. Terms that are generally understood or defined adequately in other readily available sources are not included.

1.3 The terminology described in this document is that of the validation process and may differ from that traditionally encountered in ASTM standards.

1.4 A definition is a single sentence with additional information included in a *Discussion*.

2. Terminology

accuracy—the agreement between an experimentally determined value and the accepted reference value.

DISCUSSION—Accuracy is also known as bias in ASTM practice.

analyte—the specific component measured in an analysis.

baseline—the resultant analytical trace when no test specimen is present.

blank—the measured value obtained when a specific component is not present during the measurement.

bow—the maximum deviation between an actual instrument reading and the reading predicted by a straight line drawn between upper and lower calibration points, expressed as a percent of full scale.

calibration—to check, adjust, or systematically standardize the gradations of a quantitative measuring signal.

coefficient or variation—the standard deviation divided by the value of the parameter measured.

detection limit—the minimum quantity of analyte that can be reliably detected but not necessarily quantified.

drift—the relatively slow change in baseline output due to instrument performance taken to be the maximum deviation between any two points within a specified time period.

figure-of-merit—a performance characteristic of a method believed to be useful when deciding its applicability for a specific measurement situation.

DISCUSSION—Typical figures-of-merit include accuracy, repeatability, sensitivity, etc.

linearity—the maximum deviation of output points from the "best fit" linear curve to the data excluding proven outliers expressed as a percentage of the full-scale computed output.

noise—the maximum amplitude, peak-to-peak, for all random variations.

noise, short term—is that with a frequency greater than six cycles per min (equivalent to a period of 10 seconds or less).

DISCUSSION—Short Term Noise determines the smallest signal detectable and limits the precision attainable in quantitation of low level measurements.

noise, long term—is that with a frequency between 0.6 and 6 cycles per min (equivalent to periods of 100 and 10 s).

DISCUSSION—Long Term Noise may be mistaken for the response of a test specimen.

precision—the degree of agreement among or between repeated measurements of the same property.

quantitation limit—the minimum amount that can be quantified with acceptable accuracy and precision.

relative standard deviation—the coefficient of variation expressed as a percentage.

repeatability—a quantitative measure of the precision of the results by a single analyst in a given laboratory using a given apparatus.

reproducibility—a quantitative measure of the precision of the results between two laboratories.

resolution—a quantitative measure of the ability to separate closely spaced transitions at an appropriate analytic level.

DISCUSSION—Resolution is one component of selectivity.

selectivity—the ability to accurately and specifically measure the analyte in the presence of components that may be expected to be present in the test specimen.

sensitivity—the capability of methodology or instrumentation to discriminate between samples having differing concentrations or containing differing amounts of an analyte.

[1] This terminology is under the jurisdiction of ASTM Committee E37 on Thermal Measurements and is the direct responsibility of Subcommittee E37.03 on Nomenclature and Definitions.

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