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Standard Terminology Relating to Performance Validation in Thermal Analysis¹

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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.

certificate—a formal document testifying to the truth of a matter (see also certification).

certification—process of issuing a formal document testifying to the truth of a matter.

NOTE 1— Includes conditions (such as accreditation), materials (such as reference materials), processes (such as calibration), and the like.

certified reference material—a reference material lot, the

property(ies) of which, determined by measurement is/are certified by an identified organization and found on an accompanying certificate.

NOTE 2—Each certified value should be accompanied by an uncertainty at a stated level of confidence.

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

conformance—agreement of a product, process or service with specification requirements.

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.

reference material—a material or substance, the property for which is sufficiently homogeneous and well established to be used for the calibration of apparatus, or the assessment of a measurement method.

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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