



Standard Guide for Statistical Procedures to Use in Developing and Applying Test Methods¹

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^ε¹ NOTE—Editorial corrections were made to 3.1.25 in April 2013.

1. Scope

1.1 This guide identifies statistical procedures for use in developing new test methods or revising or evaluating existing test methods, or both.

1.2 This guide also cites statistical procedures especially useful in the application of test methods.

2. Referenced Documents

2.1 ASTM Standards:²

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E178 Practice for Dealing With Outlying Observations

E456 Terminology Relating to Quality and Statistics

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E1169 Practice for Conducting Ruggedness Tests

E1402 Guide for Sampling Design

E2282 Guide for Defining the Test Result of a Test Method

E2489 Practice for Statistical Analysis of One-Sample and Two-Sample Interlaboratory Proficiency Testing Programs

E2554 Practice for Estimating and Monitoring the Uncertainty of Test Results of a Test Method Using Control Chart Techniques

E2586 Practice for Calculating and Using Basic Statistics

E2587 Practice for Use of Control Charts in Statistical Process Control

E2655 Guide for Reporting Uncertainty of Test Results and Use of the Term Measurement Uncertainty in ASTM Test Methods

¹ This guide is under the jurisdiction of ASTM Committee E11 on Quality and Statistics and is the direct responsibility of Subcommittee E11.20 on Test Method Evaluation and Quality Control.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3. Terminology

3.1 *Definitions*—For a more extensive list of terms in E11 standards, see Terminology E456.

3.1.1 *bias, n*—the difference between the expectation of the test results and an accepted reference value. **E177**

3.1.1.1 *Discussion*—Statistical procedures include the sampling considerations or the experiment design for the collection of data, or both, and the numerical and graphical approaches to summarize and analyze the collected data.

3.1.2 *coefficient of variation, CV, n*—for a nonnegative characteristic, the ratio of the standard deviation to the mean for a population or sample. **E2586**

3.1.3 *component of variance, n*—a part of a total variance identified with a specified source of variability.

3.1.4 *control chart, n*—chart on which are plotted a statistical measure of a subgroup versus time of sampling along with limits based on the statistical distribution of that measure so as to indicate how much common, or chance, cause variation is inherent in the process or product. **E2587**

3.1.5 *observation, n*—the process of obtaining information regarding the presence or absence of an attribute of a test specimen, or of making a reading on a characteristic or dimension of a test specimen. **E2282**

3.1.6 *observed value, n*—the value obtained by making an observation. **E2282**

3.1.7 *precision, n*—the closeness of agreement between independent test results obtained under stipulated conditions. **E177**

3.1.8 *proficiency testing, n*—determination of laboratory testing performance by means of interlaboratory comparisons. **E2489**

3.1.9 *repeatability, n*—precision under repeatability conditions. **E177**

3.1.10 *repeatability conditions, n*—conditions where independent test results are obtained with the same method on identical test items in the same laboratory by the same operator using the same equipment within short intervals of time. **E177**