



Designation: D 4697 – 95

Standard Guide for Maintaining Test Methods in the User's Laboratory¹

This standard is issued under the fixed designation D 4697; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide is intended to assist laboratories in maintaining precision and controlling bias in testing. It includes statistical procedures for detecting lack of control, changes in calibration constants, and in operator technique. Suggestions are given for the correction of some out of control situations.

1.2 This guide includes the following topics:

Topic Title	Section Number
Scope	1
Referenced Documents	2
Terminology	3
Significance and Use	4
Calibration Control	5
Test Performance Control	6

Annexes:

Calibration Control	Annex A1
Test Performance Control	Annex A2

1.3 This standard does not give all of the details for preparing statistical quality control charts or the statistical tests used to interpret them, but such information may be found easily in a number of publications.²

2. Referenced Documents

2.1 ASTM Standards:

D 123 Terminology Relating to Textiles³

D 1578 Test Method for Breaking Strength of Yarn in Skein Form³

E 456 Terminology Relating to Quality and Statistics⁴

2.2 ASTM Adjuncts:

TEX-PAC⁵

NOTE 1—Tex-Pac is a group of PC programs on floppy disks, available through ASTM Headquarters, 100 Barr Harbor Drive, Conshohocken, PA

¹ This guide is under the jurisdiction of ASTM Committee D-13 on Textiles and is the direct responsibility of Subcommittee D13.93 on Statistics.

Current edition approved May 15, 1995. Published July 1995. Originally published as D 4697 – 87. Last previous edition D 4697 – 91.

² For information see: Juran, J. M., ed., *Quality Control Handbook*, McGraw Hill, New York, 4th ed., 1988; *Manual on Presentation of Data and Control Chart Analysis*, ASTM STP 15D, ASTM, 1976; and *Statistical Quality Control Handbook*, Western Electric Co., Inc., 2nd ed., 1985 (Inquiries may be made to: AT&T Technologies, Commercial Sales Clerk, Select Code 700-444, P.O. Box 19901, Indianapolis, IN 44219).

³ *Annual Book of ASTM Standards*, Vol 07.01.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ PC programs on floppy disks are available through ASTM. For a 3½ inch disk request PCN:12-429040-18, for a 5¼ inch disk request PCN:12-429041-18.

19428, USA. The control chart parameters described in the annexes of this guide can be calculated with one of these programs and the control charts screen plotted.

3. Terminology

3.1 Definitions:

3.1.1 *accuracy*, *n*—of a test method, the degree of agreement between the true value of the property being tested (or an accepted standard value) and the average of many observations made according to the test method, preferably by many observers. (See also *bias* and *precision*.)

3.1.2 *attribute data*, *n*—observed values or determinations which indicate the presence or absence of specific characteristics.

3.1.3 *bias*, *n*—in statistics, a constant or systematic error in test results.

3.1.3.1 *Discussion*—Bias can exist between the true value and a test result obtained from one method; between test results from two methods; or between two test results obtained from a single method, for example, between operators or between laboratories.

3.1.4 *calibrate*, *vt*—to determine and record the relationship between a set of standard units of measure and the output of an instrument or test procedure.

3.1.5 *calibration*, *n*—the act or process of calibrating; the recorded relationship resulting from calibrating.

3.1.6 *measurement value*, *n*—the numerical result of quantifying a particular property or dimension. (*Syn.* measurement, measurement datum.)

3.1.7 *moving range*, *MR*, *n*—the difference without regard to sign between two successive observations.

3.1.8 *precision*, *n*—the degree of agreement within a set of observations or test results obtained as directed in a test method.

3.1.8.1 *Discussion*—The term “precision” delimited in various ways is used to describe different aspects of precision. This usage was chosen in preference to the use of “repeatability” and “reproducibility” which have been assigned conflicting meanings by various authors and standardizing bodies.

3.1.9 *test method*, *n*—a definitive procedure for the identification, measurement, and evaluation of one or more qualities, characteristics, or properties of a material, product, system, or service that produces a test result.

3.1.10 *verification*, *n*—the act or process of verifying.

3.1.11 *verify*, *vt*—(1) to determine whether a previously calibrated instrument, standard solution, or other standard is