Designation: G 163 – 99 (Reapproved 2004)

Standard Guide for Digital Data Acquisition in Wear and Friction Measurements[1]

This standard is issued under the fixed designation G 163; 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 covers the providing of general guidance in applying hardware and software to digitally acquire wear and friction data in laboratory test systems. It points out important considerations in such data acquisition. It does not make specific recommendations or discuss specific details regarding commercial hardware or software.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

G 40 Terminology Relating to Erosion and Wear

G 77 Test Method for Ranking Resistance of Materials to Sliding Wear Using Block-on-Ring Wear Test

G 83 Test Method for Wear Testing with a Crossed-Cylinder Apparatus

G 99 Test Method for Wear Testing with a Pin-on-Disk Apparatus

G 115 Guide for Measuring and Reporting Friction Coefficients

G 118 Guide for Recommended Format of Wear Test Data Suitable for Databases

3. Terminology

3.1 *Definitions:*

3.1.1 *wear*, *n*—damage to a surface, generally involving progressive loss of material, due to relative motion between that surface and a contacting substance or substances.

3.1.2 *coefficient of friction*, *n*—the dimensionless ratio of the friction force between two bodies to the normal force pressing the bodies together.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *hardware*, *n*—mechanical and electronic components in instrumentation used to acquire data.

3.2.2 *software*, *n*—computer code that can be executed to control hardware systems and store data.

4. Summary of Guide

4.1 Several important issues relating to digital data acquisition in wear and friction measurements are identified and explained. Hardware and software choices are described in general terms, along with some important considerations in data storage.

5. Significance and Use

5.1 The guide illustrates the steps and considerations involved with digital data acquisition. While analog recording of wear and friction data has been customary in the field for some time, a trend of increasing use of digital methods is now apparent.

5.2 Multi-station wear and friction testing is increasing in use, and because of the increased volume of data in such approaches, the use of digital data acquisition facilitates such testing.

5.3 The same hardware and software used for the initial analog data conversion to digital form can often also be used for initial data processing, for example, multiple-point averaging. This can conveniently lead to computer-based storage of processed data in digital form.

5.4 Databases are frequently constructed in computerized format (see Guide G 118) in order to hold large amounts of wear and friction data from laboratory test programs.

6. Hardware and Software

6.1 *Hardware*—Necessary electronic components associated with the wear test system include sensors (for example, force transducers, strain gages, linear variable differential transformers), a data acquisition system (for example, analog signal conditioners, filters, analog-to-digital convertors, other electronic circuits), a controlling computer, and a digital data

[1] This guide is under the jurisdiction of ASTM Committee G02 on Wear and Erosion and is the direct responsibility of Subcommittee G02.20 on Computerization in Wear and Erosion.

Current edition approved Nov 1, 2004. Published November 2004. Originally approved in 1999. Last previous edition approved in 1999 as G 163 – 99.

[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.