



Standard Practices for Verification of Displacement Measuring Systems and Devices Used in Material Testing Machines¹

This standard is issued under the fixed designation E2309/E2309M; 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 These practices cover procedures and requirements for the calibration and verification of displacement measuring systems by means of standard calibration devices for static and quasi-static testing machines. This practice is not intended to be complete purchase specifications for testing machines or displacement measuring systems. Displacement measuring systems are not intended to be used for the determination of strain. See Practice E83.

1.2 These procedures apply to the verification of the displacement measuring systems associated with the testing machine, such as a scale, dial, marked or unmarked recorder chart, digital display, etc. *In all cases the buyer/owner/user must designate the displacement-measuring system(s) to be verified.*

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 Displacement values indicated on displays/printouts of testing machine data systems—be they instantaneous, delayed, stored, or retransmitted—which are within the Classification criteria listed in Table 1, comply with Practices E2309/E2309M.

1.5 *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

E83 Practice for Verification and Classification of Extensometer Systems

3. Terminology

3.1 *Definitions*:

3.1.1 *accuracy, n*—degree of conformity of a measure to a standard.

3.1.2 *error, n*—the amount of deviation from a standard.

3.1.2.1 *Discussion*—The word “error” shall be used with numerical values, for example, “At a displacement of +1.00 in., the error of the displacement measuring system was +0.001 in.”

3.1.3 *tolerance, n*—the allowable deviation from a standard.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *calibration, n*—in the case of displacement measuring systems used with testing machines, the process of comparing the displacement indication of the machine or system under test to that of a standard, making adjustments as needed to meet error requirements.

3.2.2 *capacity range, n*—in the case of testing machines, the range of displacement for which it is designed. Some testing machines have more than one capacity range, that is, multiple ranges.

3.2.3 *correction, n*—in the case of a testing machine, the difference obtained by subtracting the measured displacement from the correct value of the applied displacement.

3.2.4 *displacement, n*—a movement or measurement of length expressed in terms of millimeters, inches, etc.

3.2.5 *displacement measuring system, n*—a device or set of devices comprised of a displacement transducer and associated instrumentation.

¹ These practices are under the jurisdiction of ASTM Committee E28 on Mechanical Testing and is the direct responsibility of Subcommittee E28.01 on Calibration of Mechanical Testing Machines and Apparatus.

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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.