



Standard Practices for Verification of Speed for Material Testing Machines¹

This standard is issued under the fixed designation E2658; 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 testing machine speed by means of standard calibration devices. This practice is not intended to be complete purchase specifications for testing machines.

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

1.3 These practices give guidance, recommendations, and examples, specific to electro-mechanical testing machines. The practice may also be used to verify actuator speed for hydraulic testing machines.

1.4 This standard cannot be used to verify cycle counting or frequency related to cyclic fatigue testing applications.

1.5 Since conversion factors are not required in this practice, either SI units (mm/min), or English [in/min], can be used as the standard.

1.6 Speed measurement values and or settings 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 E2658.

1.7 *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.*

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. Referenced Documents

2.1 ASTM Standards:²

E2309 Practices for Verification of Displacement Measuring Systems and Devices Used in Material Testing Machines

3. Terminology

3.1 Definitions:

3.1.1 *percent error, n*—in the case of a speed measuring system, the ratio, expressed as a percent, of the error to the reference value of the applied speed.

3.1.1.1 *Discussion*—The speed, as measured by the testing machine, and the speed, as computed from the readings of the calibration devices, shall be recorded at each verified speed. The percent error, shall be calculated from this data as follows:

$$\text{Percent Error} = [(TMsp - Refsp)/Refsp] \times 100 \quad (1)$$

where:

TMsp = speed measured by the machine being verified, mm/min [in/min], and

Refsp = reference value of the measured speed, mm/min [in/min], as determined by the calibration device.

Not all testing machines have available indicated speed values. In such cases, the verification of the testing machine's speed setting is applicable. The percent error for the testing machine speed settings, shall be calculated as follows:

$$\text{Percent Error} = [(TMsp - Refsp)/Refsp] \times 100 \quad (2)$$

where:

TMsp = testing machine speed setting, mm/min (in/min), and

Refsp = reference value of the measured speed, mm/min (in/min), as determined by the calibration device.

3.1.2 *ramp-to-speed condition, n*—during a speed verification run, it is the time and or change in displacement required to achieve a constant speed condition.

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.