



Designation: F2203 – 13 (Reapproved 2022)

Standard Test Method for Linear Measurement Using Precision Steel Rule¹

This standard is issued under the fixed designation F2203; 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 test method covers the measurement of linear dimension of flexible packages and packaging materials. It is recommended for use with an allowable tolerance range of 3 mm ($\frac{1}{8}$ in.) or greater based on gauge repeatability and reproducibility presented in the Precision and Bias section.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E171/E171M Practice for Conditioning and Testing Flexible Barrier Packaging

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

3. Terminology

3.1 *Definitions:*

3.1.1 *linear dimension, n*—the measurement of length, width or relative positions.

3.1.2 *parallax error, n*—the error resulting from a change in observational relationship to a fixed position. For example,

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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.

looking at a measurement gauge from different angles can cause variation in the reporting of that measurement.

4. Significance and Use

4.1 This test method provides a means for measuring linear dimensions. Accurate measurement of dimensions can be critical to meeting specifications and characterizing process performance.

4.2 This test method should not be applied to tolerance ranges of less than 3 mm ($\frac{1}{8}$ in.) when it is preferable that test error does not exceed 30 % of tolerance range. See Precision and Bias Section for gauge repeatability and reproducibility results.

4.3 This test method does not address acceptability criteria. These need to be jointly determined by the user and producer of the product.

5. Apparatus

5.1 *Precision Steel Rule:*

5.1.1 Tempered steel rule in increments of $\frac{1}{64}$ in., 100ths, or $\frac{1}{2}$ mm.

5.1.2 Steel rule should be of sufficient length to measure full dimension of interest.

5.1.3 It is recommended that a calibration be performed on the apparatus used and it is certified to a recognized industry standard.

6. Sampling

6.1 The number of samples tested should be adequate to be predictive of performance. Caution should be taken when eliminating samples with defects as this can bias results.

7. Conditioning

7.1 Conditioning of the samples will depend on the material under evaluation. If conditioning before testing is appropriate, normal, and desirable, refer to Specification **E171/E171M**.

8. Procedure

8.1 Review applicable specifications, drawings, or procedures. Specify unit of measure to be used and directions related to precision requirements (for example, measure to nearest 0.5 mm, round up or down to nearest 0.5 mm, to $\frac{1}{64}$ in., etc.).