



Designation: D 1042 – 01a

Standard Test Method for Linear Dimensional Changes of Plastics Under Accelerated Service Conditions¹

This standard is issued under the fixed designation D 1042; 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 is designed to provide a means for measuring in plastic specimens the dimensional changes resulting from exposure to service conditions. In particular, this test method is suitable for measuring shrinkage or elongation developed under specific oven and water conditionings.

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.*

NOTE 1—There is no similar or comparable ISO standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 883 Terminology Relating to Plastics²

3. Terminology

3.1 *Definitions:* Definitions of terms applying to this test method appear in Terminology D 883.

4. Significance and Use

4.1 This test method is intended only as a convenient test method for measurement of linear dimensional changes in plastics subjected to defined conditions of test as outlined in Section 8. When all precautions are observed, measurements are reproducible to $\pm 0.02\%$.

5. Apparatus

5.1 *Scriber*, so constructed that two sharp needle points are rigidly separated by 100 ± 0.2 mm. The scriber, as shown in Fig. 1, consists of two sharp steel needles, approximately 1.5 mm in diameter. The needles are to be inserted in drilled holes with their axes parallel to each other and perpendicular to and intersecting the long axis of a stainless steel rod, 8.0 ± 0.1 mm in diameter by $125 \text{ mm} \pm 5$ mm in length. The needles' points shall extend 6 ± 1 mm beyond the supporting rod and are held

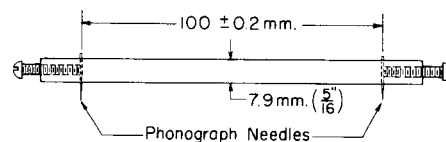


FIG. 1 Scriber

in position by set screws inserted through the ends of the rod. A stainless steel gage with reference points consisting of a center and two short concentric arcs ($R_1 = 99.80 \pm 0.02$ mm, and $R_2 = 100.20 \pm 0.02$ mm) shall be used for calibration of the scriber. Thickness of arc lines shall not exceed 0.02 mm.

NOTE 2—Phonograph needles may be used as a satisfactory scriber.

5.2 *Measuring Microscope*, having a magnification of at least $20\times$ and graduated to have a resolution of 0.1 mm.

NOTE 3—For more precise measurements, a micrometer microscope should be used.

5.3 *Beaker*, having a suitable size for the number of specimens to be evaluated and is constructed of a material that is stable under the test conditions.

5.4 *Room or Conditioning Chamber*, capable of being maintained at $23 \pm 2^\circ\text{C}$.

5.5 *Conditioning Oven*, full draft air-circulating oven, capable of being maintained within $\pm 2^\circ\text{C}$ of the set temperature.

5.6 *Absorbent Material*, cloth or paper suitable for drying.

6. Test Specimens

6.1 Specimens shall not be less than 110 mm in length in the direction of test. The preferred specimen size is 125 ± 5 mm in length by 13 ± 0.5 mm wide by $3.0 (-0.0 + 0.2)$ mm thick.

6.2 Three specimens shall be tested for each conditioning.

6.3 Individual specimens shall be positioned vertically in the specified environment.

NOTE 4—A wire hook inserted in a hole drilled in one end of the specimen has been found acceptable.

7. Conditioning and Exposure

7.1 Preconditioning

7.1.1 Precondition specimens at $23 \pm 2^\circ\text{C}$ and $50 \pm 5\%$ relative humidity for a minimum of 40 h prior to initial scribing.

NOTE 5—If moisture equilibrium is required prior to preconditioning,

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² *Annual Book of ASTM Standards*, Vol 08.01.

*A Summary of Changes section appears at the end of this standard.