



# Standard Test Method for Linear Dimensional Changes of Plastics Under Accelerated Service Conditions<sup>1</sup>

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 ( $\epsilon$ ) 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 in accordance with the procedures described in Practice D 756.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety problems, 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 756 Practice for Determination of Weight and Shape Changes of Plastics Under Accelerated Service Conditions<sup>2</sup>

D 883 Terminology Relating to Plastics<sup>2</sup>

D 1898 Practice for Sampling of Plastics<sup>3</sup>

## 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 Practice D 756. 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  $100 \pm 0.2$  mm. A very satisfactory scriber, as shown in Fig. 1, consists of two sharp steel phonograph needles (approximately 1.5 mm in diameter) inserted in holes drilled with their axes parallel to each other and perpendicular to and intersecting the long axis of a stainless steel rod, 7.9 mm ( $\frac{5}{16}$  in.) in diameter by 125 mm (5 in.) in length. The needle points extend 6 mm beyond the supporting rod and are held in position by two 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) is recommended for calibration of the scriber. Thickness of arc lines should not exceed 0.02 mm.

5.2 *Measuring Microscope*, graduated to read to 0.1 mm or better. (A Brinell microscope 20 $\times$ , for measuring Brinell hardness, is very satisfactory.) For more precise measurements, a micrometer microscope may be used.

## 6. Sampling

6.1 Sampling shall be in accordance with the present considerations outlined in Practice D 1898.

## 7. Test Specimens

7.1 The test specimens shall be similar to those prescribed in Practice D 756 with the additional requirement that in the direction of test the length should be not less than 110 mm. In practice, specimens 150 by 25 mm and of the full thickness of the material are desirable. These specimens may be suspended individually in the specified environment by wire hooks inserted in a hole punched in one end of the specimen. When one type of plastic is to be compared with another type, a standard thickness of 3.2 mm (0.125 in.) is preferred.

## 8. Procedure

8.1 Immediately following the preconditioning period of the test, scribe an arc of 100-mm radius on the surface of the test specimen. Press one needle firmly into the specimen to form a center for this and subsequent measurements. The other needle scribes the arc which is used as a reference for all subsequent measurements (see Fig. 2). Draw the arcs smoothly, using a pressure consistent with the surface hardness and test conditions to which the specimen is subjected. It is desirable to depress rather than scratch or tear the surface with the needle, although harder surfaced materials and those subjected to

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.50 on Permanence Properties. Current edition approved Feb. 15, 1993. Published April 1993. Originally published as D 1042 – 49 T. Last previous edition D 1042 – 83.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 08.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 08.02.