



Standard Test Method for Measuring Shrinkage from Mold Dimensions of Molded Plastics¹

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1. Scope

1.1 This test method is intended to measure batch-to-batch uniformity in initial shrinkage from mold to molded dimensions of either thermoplastic or thermosetting materials when molded by compression, injection, or transfer under specified conditions.

1.2 This test method does not provide for the measurement of shrinkages that may occur as molded materials age, after the first 48 h out of the mold.

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

1.4 *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:

- D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing²
- D 647 Practice for Design of Molds for Test Specimens of Plastic Molding Materials²
- D 788 Specification for Poly(Methyl Methacrylate) (PMMA) Molding and Extrusion Compounds²
- D 796 Practice for Compression Molding Test Specimens of Phenolic Molding Compounds²
- D 883 Terminology Relating to Plastics²
- D 956 Practice for Compression Molding Specimens of Amino Molding Compounds²
- D 1896 Practice for Transfer Molding Test Specimens of Thermosetting Compounds²
- D 1897 Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials²
- D 1898 Practice for Sampling of Plastics²
- D 3419 Practice for In-Line Screw-Injection Molding Test Specimens from Thermosetting Compounds³

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² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 08.02.

D 4066 Specification for Nylon Injection and Extrusion Materials³

D 4181 Specification for Acetal (POM) Molding and Extrusion Materials³

D 4549 Specification for Polystyrene Molding and Extrusion Materials (PS)⁴

D 4976 Specification for Polyethylene Plastics Molding and Extrusion Materials⁴

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method⁵

3. Terminology

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

4. Significance and Use

4.1 *Compression Molding*—In compression molding, the difference between the dimensions of a mold and of the molded article produced therein from a given material may vary according to the design and operation of the mold. It is probable that shrinkage will approach a minimum where design and operation are such that a maximum of material is forced solidly into the mold cavity or some part of it, or where the molded article is hardened to a maximum while still under pressure, particularly by cooling. In contrast, shrinkages may be much higher where the charge must flow in the mold cavity but does not receive and transmit enough pressure to be forced firmly into all its recesses, or where the molded article is not fully hardened when discharged. The plasticity of the material used may affect shrinkage insofar as it affects the retention and compression of the charge.

4.2 *Injection Molding*—In injection molding, as in compression molding, the difference between the dimensions of the mold and of the molded article produced therein from a given material may vary according to the design and operation of the mold. The difference may vary with the type and size of molding machine, the thickness of molded sections, the degree and direction of flow or movement of material in the mold, the size of the nozzle, sprue, runner, and gate, the cycle on which the machine is operated, the temperature of the mold, and the length of time that follow-up pressure is maintained. As in the

⁴ Annual Book of ASTM Standards, Vol 08.03.

⁵ Annual Book of ASTM Standards, Vol 14.02.