



Standard Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials¹

This standard is issued under the fixed designation D 3641; 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 practice covers the general principles to be followed when injection molding test specimens of thermoplastic molding and extrusion materials. This practice is to be used to obtain uniformity in methods of describing the various steps of the injection molding process and to set up uniform methods of reporting these conditions. The exact conditions required to prepare suitable specimens will vary for each plastic material. Those conditions should become a part of the specification for the material, or be agreed upon between the purchaser and the supplier. Any requirements or recommendations in the material specification which differ from this standard take precedence over those in this standard.

1.2 The methodology presented assumes the use of reciprocating screw injection molding machines.

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.*

NOTE 1—This practice is equivalent to the following parts of ISO 294: Plastics—Injection Moulding of Test Specimens of Thermoplastic Materials²; 294-1: Part 1—General Principles and Multipurpose Test Specimens (ISO Type A Mould) and Bars (ISO Type B Mould)²; ISO 294-2: Part 2—Small Tensile Bars (ISO Type C Mould); ISO 294-3: Part 3—Plates (ISO Type D Moulds).

2. Referenced Documents

2.1 ASTM Standards:

D 256 Test Methods for Impact Resistance of Plastics and Electrical Insulating Materials³

D 570 Test Method for Water Absorption of Plastics³

D 638 Test Method for Tensile Properties of Plastics³

D 648 Test Method for Deflection Temperature of Plastics Under Flexural Load³

D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials³

D 883 Terminology Relating to Plastics³

D 955 Test Method for Measuring Shrinkage from Mold Dimensions of Molded Plastics³

D 957 Practice for Determining Surface Temperature of Molds for Plastics³

2.2 ISO Standards:

ISO 3167 Plastics—Preparation and Use of Multipurpose Test Specimens²

ISO 294-1: Plastics—Injection Moulding of Test Specimens of Thermoplastic Materials—Part 1: General Principles and Multipurpose Test Specimens (ISO Type A Mould) and Bars (ISO Type B Mould)²

ISO 294-2: Plastics—Injection Moulding of Test Specimens of Thermoplastic Materials—Part 2: Small Tensile Bars (ISO Type C Mould)²

ISO 294-3: Plastics—Injection Moulding of Test Specimens of Thermoplastic Materials—Part 3: Plates (ISO Type D Moulds)²

3. Terminology

3.1 *Definitions*—Definitions of terms applying to this practice appear in Terminology D 883.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *average injection velocity, n*—the mean value of the velocity of the molten plastic flow front within a cavity during the injection time that is calculated from the shot volume and injection time. (See Terminology D 883.)

3.2.1.1 *Discussion*—The average injection velocity is calculated as follows:

$$V_{av} = \frac{V_s}{T_i \times A_c \times n}$$

where:

V_{av} = average injection velocity, mm/s,

V_s = shot volume, mm³,

T_i = injection time, s,

A_c = cross section of the cavity, mm², (see 3.2.2) and

¹ This practice is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.09 on Specimen Preparation.

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² Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

³ *Annual Book of ASTM Standards*, Vol 08.01.

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