



Designation: D 1457 – 92

AMERICAN SOCIETY FOR TESTING AND MATERIALS

1916 Race St. Philadelphia, Pa 19103

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An American National Standard

Standard Specification for Polytetrafluoroethylene (PTFE) Molding and Extrusion Materials¹

This standard is issued under the fixed designation D 1457; 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.

This standard has been approved for use by agencies of the Department of Defense to replace L-P-403c. Consult the DoD Index of Specifications and Standards for the specific year which has been adopted by the Department of Defense.

1. Scope

1.1 This specification covers molding and extrusion resins of polytetrafluoroethylene (PTFE) that have never been melted after preforming or molding and are normally processed by methods similar to those used in powder metallurgy or ceramics, or by ram extrusion or extrusion with a volatile aid. These PTFE resins are homopolymers of tetrafluoroethylene or copolymers containing not more than 1 % by weight of other fluoromonomers. The usual methods of processing thermoplastics generally are not applicable to these materials because of their viscoelastic properties at processing temperatures. The materials included herein do not include mixtures of PTFE resin with additives such as colorants, fillers, plasticizers, any fabricated articles, or reprocessed or reground resin. The methods and properties included are those required to identify the various types of resins. Additional procedures are provided in Appendix X1 for further characterization of the resins.

1.2 The values stated in SI units as detailed in Practice E 380 are to be regarded as the standard, and the practices of E 380 are incorporated herein.

1.3 The following precautionary caveat pertains only to the test methods portion, Section 13, of this specification: *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.*

2. Referenced Documents

2.1 ASTM Standards:

- D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing²
- D 638 Test Method for Tensile Properties of Plastics²
- D 792 Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement²
- D 883 Terminology Relating to Plastics^{2,3}
- D 1505 Test Method for Density of Plastics by the Density-Gradient Technique²

- D 1895 Test Methods for Apparent Density, Bulk Factor, and Pourability of Plastic Materials⁴
- D 1898 Practice for Sampling of Plastics⁴
- D 3297 Practice for Molding and Matching Tolerances for PTFE Resin Parts⁵
- D 3892 Practice for Packaging/Packing of Plastics⁵
- D 4052 Test Method for Density and Relative Density of Liquids By Digital Density Meter⁶
- D 4591 Test Method for Determining Temperatures and Heats of Transitions of Fluoropolymers by Differential Scanning Calorimetry⁵
- E 11 Specification for Wire-Cloth Sieves for Testing Purposes⁷
- E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods⁸
- E 380 Practice for Use of the International System of Units (SI)⁸
- E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method⁸
- 2.2 *Military Standard*:⁹
- MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes

3. Terminology

3.1 Definitions:

3.1.1 *General*—The terminology given in Terminology D 883 is applicable to this specification.

3.2 Descriptions of Terms Specific to This Standard:

3.2.1 *bulk density, (n)*—the weight in grams of a volume of 1000 mL of resin measured under the conditions of the test.

3.2.2 *extended specific gravity, (n)*—the specific gravity of a specimen of PTFE material molded as described in this specification and sintered for an extended period of time, compared to the sintering time for the measurement of SSG using the appropriate sintering schedule given in this specification.

3.2.3 *preforming, (n)*—compacting powdered PTFE material under pressure in a mold to produce a solid object, called a preform, that is capable of being handled. Molding and

¹ This specification is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials, and subsection 12 on Fluoropolymers.

Current edition approved Oct. 30, 1992. Published December 1992. Originally published as D 1457 – 56 T. Last previous edition D 1457 – 91a.

² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 08.04.

⁴ Annual Book of ASTM Standards, Vol 08.02.

⁵ Annual Book of ASTM Standards, Vol 08.03.

⁶ Annual Book of ASTM Standards, Vol 05.03.

⁷ Annual Book of ASTM Standards, Vols 14.02, 04.01, and 04.02.

⁸ Annual Book of ASTM Standards, Vol 14.02.

⁹ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.