



Standard Specification for Extruded and Compression Molded Basic Shapes Made from Thermoplastic Polyester (TPES)¹

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INTRODUCTION

This specification is intended to be a means of calling out mechanical grade plastic product used in the fabrication of end items or parts.

1. Scope*

1.1 This specification covers requirements and test methods for the material, dimensions, and workmanship, and the properties of extruded and compression molded plate, rod and tubular bar manufactured from thermoplastic polyester.

1.2 The properties included in this specification are those required for the compositions covered. Use the classification system given in Section 4 to describe requirements necessary to identify particular characteristics important to specialized applications.

1.3 This specification allows the use of recycled plastics² (see Section 4).

1.4 The values are stated in inch-pound units and are regarded as the standard in all property and dimensional tables. For reference purposes, SI units are also included in Table 1 and Table S-TPES only.

1.5 The following precautionary caveat pertains only to the test method portions sections of this specification. *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 known ISO equivalent to this standard.

¹ This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials (Section D20.15.21).

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² As defined in Guide D7209.

2. Referenced Documents

2.1 ASTM Standards:³

D256 Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

D618 Practice for Conditioning Plastics for Testing

D638 Test Method for Tensile Properties of Plastics

D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

D883 Terminology Relating to Plastics

D3892 Practice for Packaging/Packing of Plastics

D4507 Specification for Thermoplastic Polyester (TPES) Materials (Withdrawn 1999)⁴

D4000 Classification System for Specifying Plastic Materials

D5927 Classification System for Thermoplastic Polyester (TPES) Injection and Extrusion Materials Based on ISO Test Methods

D7209 Guide for Waste Reduction, Resource Recovery, and Use of Recycled Polymeric Materials and Products

3. Terminology

3.1 Definitions:

3.1.1 For definitions of other technical terms pertaining to plastics used in this specification, see Terminology D883 or Guide D7209.

3.2 Definitions of Terms Specific to This Standard:

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

⁴ The last approved version of this historical standard is referenced on www.astm.org.

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

3.2.1 *plate, n*—flat stock ¼ in. (6.4 mm) or greater.

3.2.2 *recycled-plastic shape, n*—a product made from up to 100 % recycled plastic.

3.2.3 *rod, n*—a solid cylindrical shape with a minimum diameter of ⅛ in. (3.2 mm).

3.2.4 *tubular bar, n*—an annular shape with minimum inside diameter of ⅜ in. (9.6 mm) and minimum wall thickness of ⅛ in. (1.6 mm).

4. Classification and Material

4.1 Product shape and size as defined in the applicable purchase order.

4.2 This specification covers product extruded and compression molded as listed in Table S-TPES. Products included in the designations reference Specification **D4507** or Specification **D5927** callouts where applicable.

4.2.1 Categorize the type of thermoplastic polyester shape product by type, grade, and class depending on resin and filler compositions as defined in Table S-TPES.

4.2.2 Use the following sections to categorize each type of thermoplastic polyester shape into one of several grades:

4.2.2.1 *Grade 1—General Purpose*—Extruded or compression molded product made using only 100 % virgin thermoplastic polyester resin.

4.2.2.2 *Grade 2—Recycled*—Extruded or compression molded product made using any amount up to 100 % recycled thermoplastic polyester plastics.

4.3 The type, class and grade is further differentiated based on dimensional stability (elevated temperature excursion test), Table S-TPES, and dimensional requirements, Tables A and B.

4.4 Property Tables:

4.4.1 Use Table S-TPES to describe both extruded or compression molded products.

4.4.2 Use Table 1 also to describe extruded or compression molded products not included in Table S-TPES via a cell callout that includes the applicable Table S-TPES thermoplastic polyester type and specific properties (Designations 1 through 7).

4.4.3 To facilitate the incorporation of future or special materials not covered by the Table S-TPES, the “as specified” category (00) for type, class and grade is shown in the table with the basic properties to be obtained from Table 1, as they apply.

4.4.4 *Reinforcements and Additive Materials*—A symbol (single-letter) will be used for the major reinforcement or combination, or both, along with two numbers that indicate the percentage of addition by mass with the tolerances as tabulated below. This must be included in all Table 1 callouts.

Symbol	Material	Tolerance (Based on the Total Mass)
C	Carbon and graphite fiber reinforced	± 2 %
G	Glass-reinforced	
	< 15 % glass content	± 2 %
	> 15 % glass content	± 3 %
L	Lubricants (for example, PTFE, graphite and silicone)	by agreement between the supplier and the user
M	Mineral	± 2 %
R	Combinations of reinforcements or fillers, or both	± 3 % for the total reinforcement

4.5 *Callout Designation*—A one-line system shall be used to specify thermoplastic polyester materials covered by this specification. The system uses pre-defined cells to refer to specific aspects of this specification as illustrated below:

4.5.1 Examples:

4.5.1.1 *Example 1*—Product made from general purpose PBT

CELL CALLOUT: S-TPES0111

S-TPES01 = Product made from PBT in accordance with Table S-TPES

1 = Unfilled class

1 = General purpose grade product

4.5.1.2 *Example 2*—Product made from general purpose PET

CELL CALLOUT: S-TPES0211

S-TPES02 = Product made from PET in accordance with Table S-TPES

1 = Unfilled class

1 = General purpose grade product

4.5.2 These two examples illustrate how a one-line, alphanumeric sequence can identify the product composition, commercial parameters and physical characteristics of extruded or compression molded product. A space must be used as a separator between the specification number and the type designation. No separators are needed between type, class and grade. When special notes are to be included, such information shall be preceded by a comma. Special tolerances must be noted at time of order and are inserted after the grade in parentheses and preceded by a comma.

5. Ordering Information

5.1 All shapes covered by this specification shall be ordered using the proper callout designation (see 4.5).

6. Physical Property Requirements

6.1 The physical property values listed within this specification’s tables are to be considered minimum specification values. Any requirement for specific test data for a given production lot shall be specified at the time of order. Use Table