



~~Designation: D6098-97 (Reapproved 2003)~~ Designation: D6098 – 10

## Standard Specification for Extruded and Compression Molded Shapes Made from Polycarbonate (PC)<sup>1</sup>

This standard is issued under the fixed designation D6098; 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.

### 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 polycarbonate.

1.2 This specification is not intended to cover materials used in glazing and signage as defined in 3.2.1 and 3.2.6. It is intended to be a means of calling out mechanical grade plastic products used for fabrication of end items or parts as defined in 3.2.2.

1.3 The properties included in this specification are those required for the compositions covered. Requirements necessary to identify particular characteristics important to specialized applications ~~may~~ are to be described by using the classification system given in Section 4.

1.4 This specification allows for the use of recycled plastics as defined in Guide ~~D5033~~D7209.<sup>2</sup>

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

1.6 The following precautionary caveat pertains only to the test method portions, Section 12, 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.

#### 2. Referenced Documents

##### 2.1 ASTM Standards:<sup>3</sup>

D256 [Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics](#) [7B5200d0b/astm-d6098-10](#)

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](#)

D3935 [Specification for Polycarbonate \(PC\) Unfilled and Reinforced Material](#)

D4000 [Classification System for Specifying Plastic Materials](#)

~~D5033~~D7209 [Guide for Development of ASTM Standards Relating to Recycling and Use of Recycled Plastics](#) [7209](#) [Guide for Waste Reduction, Resource Recovery, and Use of Recycled Polymeric Materials and Products](#)

##### 2.2 ANSI Standard:

Z1.4-1993 [Sampling Procedures and Tables for Inspection by Attributes](#)<sup>4</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials. Current edition approved March 10, 2003. Published May 2003. Originally approved in 1997. Last previous edition approved in 1997 as D6098-97. DOI: [10.1520/D6098-97R03](#).

Current edition approved Dec. 1, 2010. Published January 2011. Originally approved in 1997. Last previous edition approved in 2003 as D6098 - 97(2003). DOI: [10.1520/D6098-10](#).

<sup>2</sup> As defined in Guide ~~D5033~~D7209.

<sup>3</sup> 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.

<sup>4</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, [http://www.ansi.org](#).

### 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 D5033D7209.

3.1.2 *regrind plastic, n*—a product or scrap such as sprues and runners and edge trim that have been reclaimed by shredding and granulating for use in-house.

#### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *glazing product, n*—a finished product which is glazed or set in frame or sash and not held by mechanical fasteners which pass through the product.

3.2.2 *mechanical grade plastic product, n*—extruded or compression molded shapes made from polycarbonate used for fabrication of end items or parts.

3.2.3 *plate, n*—flat stock greater than ¼ in.

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

3.2.5 *rod, n*—an extruded solid cylindrical shape with a minimum diameter of ⅛ in.

3.2.6 *signage product, n*—a fabricated sign or outdoor/indoor structure, consisting of any letter, figure, character, mark, point, plane, marquee sign, design, poster, pictorial, picture, stripe, line, trademark, reading matter or illuminating device, which is constructed, attached, erected, fastened, or manufactured in any manner so that the same shall be used for the attraction of the public to any place, subject, person, firm, corporation, public performance, article, machine or merchandise, and displayed in any manner for recognized advertising purposes.

3.2.7 *tubular bar, n*—an extruded annular shape with minimum inside diameter of ⅜ in. and minimum wall thickness of ⅛ in.

### 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-PC. Products included in the designations refer to Specification D3935 where applicable.

4.2.1 The type of polycarbonate shape product may be categorized by type, grade and class depending on resin and filler compositions as defined in Table S-PC.

4.2.2 Each type of polycarbonate shape may be categorized into one of several grades as follows:

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

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

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

#### 4.4 Property Tables:

4.4.1 Table S-PC may be used to describe both extruded or compression molded products.

4.4.2 Table 1 may also be used to describe extruded or compression molded products not included in Table S-PC via a cell callout that includes the applicable Table S-PC polycarbonate type and specific properties (Designations 1–7).

4.4.3 To facilitate the incorporation of future or special materials not covered by Table S-PC, 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 >15 % glass content	±2 % ±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 polycarbonate 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 polycarbonate:

CELL CALLOUT: S-PC0111		
S-PC01	=	Product made from PC in accordance with Table S-PC
1	=	Unfilled class
1	=	General purpose grade product

**4.5.1.2 Example 2**—Product made from 20 % glass reinforced general purpose polycarbonate:

CELL CALLOUT: S-PC0100G20I3454430		
S-PC0100	=	Product made from PC in accordance with Table S-PC
G20	=	20 % glass
1	=	Table 1 properties
3	=	Tensile strength (10,000 psi)
4	=	Elongation at break (10 %)
5	=	Tensile Modulus (500,000 psi)
4	=	Dimensional stability (0.4 %)
4	=	Flexural Modulus (550,000 psi)
3	=	Izod Impact (1.0 ft-lb/in. of notch)
0	=	Unspecified

4.5.2 These two examples illustrate how a one-line, alpha-numeric 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 should be preceded by a comma. Special tolerances must be noted at the time of order and are inserted after the grade in parenthesis 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 should be specified at the time of order. Physical properties for products not yet included in Table S-PC may be specified using Table 1 for extruded or compression molded products.

## 7. Dimensional Requirements

7.1 The type, class and grade is differentiated based on dimensional stability (elevated temperature excursion test), as indicated in Table S-PC.

7.2 Products shall be produced within commercial tolerances and with the lowest stress levels for machined parts as delineated in Tables A-1, B-1, and B-2.

7.3 Tubular bar dimensions shall be supplied in the unfinished condition, unless otherwise specified at time of order, sufficient to finish to the nominal dimension ordered.

7.4 The maximum allowable camber and/or bow shall be within the limits referenced in Tables A-1, B-1, and B-2.

## 8. Workmanship, Finish, and Appearance

8.1 *Appearance*—The resin material color is transparent with water-white or light straw color. Natural resin is also offered with various amounts of blue tinting. The product color shall be as published by the shapes manufacturer. They shall be uniform in color throughout the thickness. Specific colors and color matching only as agreed to by order.

8.1.1 Physical properties, although unaffected by tinting, may be affected if coloring by other colors. means.

8.2 *Finish*—All products shall be free of blisters, wrinkles, cracks, gouges and defects that restrict commercial use of the product. Special surface finish shall be supplied only when specified in the purchase order or contract.

8.3 *Defects*—All products shall be free of voids, dirt, foreign material and embedded particles exceeding 0.040 in. maximum diameter as defined in 8.3.1.

8.3.1 The criteria for determining the internal cleanliness shall be external visual inspection. A maximum number of two internal defects per square foot of plate and one foot length of rod and tubular bar are allowed. Clusters of defects less than 0.040 in. diameter are to be counted as a single defect.

8.3.2 For compression molded products, four defects up to 0.080 in. diameter per square foot of plate are allowed.

## 9. Sampling

9.1 Sampling shall be statistically adequate to satisfy the requirements of this specification as applicable (see ANSI Z1.4 - 1993).

9.2 For purposes of sampling, an inspection lot for examination and tests shall consist of all material of the same type, class, grade and nominal size submitted for inspection at one time.

## 10. Number of Tests

10.1 Routine lot inspection shall consist of all the criteria specified in the applicable product tables.