~~Designation:D707–05~~

~~Standard Specification for~~ Designation: D707 – 09

Standard Classification System and Basis for Specification for Cellulose Acetate Butyrate Molding and Extrusion Compounds[1]

This standard is issued under the fixed designation D707; 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.

1. Scope*

1.1 This ~~specification~~ classification system covers requirements for plasticized cellulose acetate butyrate thermoplastic compounds suitable for injection molding and extrusion. These compounds have a butyryl content less than 38 % and an acetyl content less than 15 % and ~~may or may not~~ can contain dyes and pigments. This ~~specification~~ classification system does not include special materials compounded for special applications. Cellulosic plastic materials, being thermoplastic, are reprocessable and recyclable. This ~~specification~~ classification system allows for the use of those cellulosic materials, provided that all specific requirements of this ~~specification~~ classification system are met.

1.2 The properties included in this ~~specification~~ classification system are those required to identify the compositions covered. ~~There may be other~~ Other requirements necessary to identify particular characteristics important to specialized ~~applications. These may be~~applications are specified by using the suffixes as given in Section 5.

1.3 This classification system and subsequent line call out (specification) are intended to provide a means of calling out plastic materials used in the fabrication of end items or parts. It is not intended for the selection of materials. Material selection ~~should~~can be made by those having expertise in the plastic field only after careful consideration of the design and performance required of the part, environment to which it will be exposed, fabrication process to be employed, costs involved, and inherent properties of the material other than those covered by this classification system.

1.4 The values stated in SI units are to be regarded as standard.

1.5 The following safety hazards caveat pertains only to the test method portion, Section 12~~, of this specification.~~ , *of this classification system. 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 equivalent or similar ISO standard.~~ 1—There is no known ISO equivalent to this standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

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

D257 Test Methods for DC Resistance or Conductance of Insulating Materials

D570 Test Method for Water Absorption of Plastics

D618 Practice for Conditioning Plastics for Testing

D635 Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position

D638 Test Method for Tensile Properties of Plastics

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

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[1] This ~~specification~~classification system is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

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[2] 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.

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

D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
D883 Terminology Relating to Plastics
D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics
D1600 Terminology for Abbreviated Terms Relating to Plastics
D1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials
D3641 Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials
D3892 Practice for Packaging/Packing of Plastics
D4000 Classification System for Specifying Plastic Materials
D5740 Guide for Writing Material Standards in the Classification D 4000 Format
D5740~~Guide for Writing Material Standards in the Classification D 4000 Format~~

7209 Guide for Waste Reduction, Resource Recovery, and Use of Recycled Polymeric Materials and Products
E308 Practice for Computing the Colors of Objects by Using the CIE System

3. Terminology

3.1 *Definitions*—The terminology used in this ~~specification~~classification system is in accordance with Terminologies D883 and D1600.

4. Classification

4.1 This ~~specification~~classification system covers the following groups, classes, and grades (see Table CAB):
4.1.1 *Group 01*—High impact strength.
4.1.2 *Group 02*—High tensile strength.
4.1.3 *Class*—According to plasticizer content and properties specified in Table CAB.
4.1.4 *Grade 1*—For injection molding (general purpose).
4.1.5 *Grade 2*—For extrusion.

5. Suffixes

5.1 When requirements are needed that are not covered in Table CAB they shall be indicated through the use of suffixes.
5.2 A list of suffixes can be found in Classification System D4000 (Table 3) and ~~may~~can be used for additional requirements as appropriate. Additional suffixes will be added to that classification system as test methods and requirements are developed and requested.
5.3 Color and opacity shall be within the limits defined in 6.3.
~~5.4Some~~5.4 Some of the more commonly used suffixes for cellulose acetate butyrate are shown as follows:

E	=	electrical requirements as designated by the following digits:
		First Digit
	1 =	volume resistivity—Test Methods D257. dielectric strength—Test Method D149 (short-time/step-by-step).
		Second Digit
	1 =	volume resistivity and dielectric strength meet property requirements as shown in Table 1.
T	=	transmittance requirements as designated by the following digits:
		First Digit
	1 =	total luminous transmittance determined in accordance with Procedure A of Test Method D1003.
		Second Digit
	1 =	total luminous transmittance, 80 % min.

~~5.5An~~5.5 An example of this classification system for a high-impact cellulose acetate butyrate formulation would be as follows:

CAB0122FA053

CAB	=	Table CAB property requirements.
01	=	Group 01—high impact strength.
2	=	Class 2—Plasticizer range from 12 to 23 % (see Table CAB, Footnote 1).
2	=	Grade 2—Extrusion application.
F053	=	Flammability requirement from Classification System D4000—Burn rate maximum of 50 mm/min with 3 mm minimum thickness, when tested in accordance with Test Method D635.

NOTE 2—"CAB0122" corresponds to the following physical property requirements in Table CAB:

Specific gravity: 1.15–1.19.
Tensile stress at yield: 19 MPa min.
Flexural modulus: 760 MPa min.
Izod impact strength: 285 J/m min.
Water absorption: 1.6 % max.
Weight loss on heating: 2.7 % max.

6. Materials and Manufacture

6.1 Materials supplied in these forms shall be as uniform in composition and size, and as free of contamination~~,~~ as can be achieved by good manufacturing practice.
~~6.2These~~ 6.2 If these materials ~~may~~ contain colorants in the nominal amounts ordinarily employed~~, but~~ such additives shall not alter the ability of the materials to meet the specified properties.
6.3 The color of material supplied shall be comparable, within commercial match tolerances, to the color of standard samples prepared by the manufacturer.

7. Physical Requirements

7.1 Test specimens of the material shall conform to the requirements prescribed in Table CAB.