~~Designation:D787–96 (Reapproved 2003)~~ Designation: D 787 – 09

Standard Specification for Ethyl Cellulose Molding and Extrusion Compounds[1]

This standard is issued under the fixed designation D 787; 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 covers requirements for plasticized ethyl cellulose thermoplastic compounds suitable for injection molding and extrusion. It does not include special materials compounded for special applications.

1.2 The values stated in SI units are to be regarded as ~~the~~ standard. The English values given ~~in parentheses~~ are for information only.

1.3 The following precautionary statement pertains only to the Test Methods portion, Section 10 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 equivalent or similar ISO standard.~~ 1—There is no known ISO equivalent to this specification.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D 256 ~~Test Methods for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics~~

~~D569Test Method for Measuring the Flow Properties of Thermoplastic Molding Materials[2]~~ Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

D 570 Test Method for Water Absorption of Plastics

D 618 Practice for Conditioning Plastics for Testing

D 638 Test Method for Tensile Properties of Plastics

D 648 ~~Test Method for Deflection Temperature of Plastics Under Flexural Load[2]~~

~~D759Practice for Conducting Physical Property Tests of Plastics at Subnormal and Supernormal Temperatures~~ Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position

D 785 Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials

D 792 Test Methods for Density and Specific Gravity (Relative Density) ~~and Density~~ of Plastics by Displacement

D 883 Terminology Relating to Plastics

D 1505 Test Method for Density of Plastics by the Density-Gradient Technique

~~D1897Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials[2]~~

~~D1898Practice for Sampling of Plastics[2]~~ 3641 Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials

D 3892 Practice for Packaging/Packing of Plastics

3. Terminology

3.1 Terms in this specification are in accordance with Terminology D 883.

4. Classification

4.1 This specification covers two types and eleven grades of ethyl cellulose molding and extrusion compounds as classified in accordance with Table 1. Type I materials are general purpose and Type II are characterized by improved resistance to impact,

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[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.

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~~This edition includes the addition of an ISO equivalency statement and a Keywords section, the elimination of superfluous references to user/seller agreements, and the removal of specific requirements relating to Federal/Military procurement. Some references to *specimens* were changed to *samples* in keeping with normal usage within ASTM materials standards.~~

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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* ~~, Vol 08.01.~~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.**

TABLE 1 Detailed Requirements for Molded Test Specimens

NOTE 1—ft·lbf/in. × 53.3378660 = joules per metre. Megapascals (MPa) = newtons × 10^6 per metre squared.

Property	Type I					Type II						Test Methods
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	
~~Specific gravity, unpigmented, max at 23/23°C [73.4/73.4°F]~~	~~1.13~~	~~1.13~~	~~1.12~~	~~1.12~~	~~1.11~~	~~1.10~~	~~1.12~~	~~1.12~~	~~1.11~~	~~1.11~~	~~1.10~~	~~D 792~~
Specific gravity, unpigmented, max at 23/23°C (73.4/73.4°F)	1.13	1.13	1.12	1.12	1.11	1.10	1.12	1.12	1.11	1.11	1.10	D 792
Hardness (Rockwell) R scale, min	110	110	105	105	100	95	105	80	75	75	50	D 785
Tensile strength at 23°C, min:												
MPa	44.8	41.4	38.1	33.0	31.0	24.2	27.6	24.1	20.7	20.0	15.9	D 638
psi	6500	6000	5400	4800	4500	3800	4000	3500	3000	3300	2900	
~~Impact strength (Izod), min at 23°C [73.4°F]:~~												
Impact strength (Izod), min at 23°C (73.4°F):												
J/m of notch	90.7	90.7	106.7	106.7	117.3	149.5	186.7	213.5	293.4	213.5	320.3	D 256
ft·lbf/in. of notch	1.7	1.7	2.0	2.0	2.2	2.8	3.5	4.0	5.5	4.0	6.0	
~~at – 40°C [– 40°F]:~~												
at – 40°C (–40°F):												
~~J/m of notch~~	~~26.7~~	~~26.7~~	~~26.7~~	~~26.7~~	~~26.7~~	~~26.7~~	~~53.4~~	~~64.1~~	~~80.1~~	~~53.4~~	~~80.1~~	~~D 758~~
~~ft·lbf/in. of notch~~	~~0.5~~	~~0.5~~	~~0.5~~	~~0.5~~	~~0.5~~	~~0.5~~	~~1.0~~	~~1.2~~	~~1.5~~	~~1.0~~	~~1.5~~	
J/m of notch	26.7	26.7	26.7	26.7	26.7	26.7	53.4	64.1	80.1	53.4	80.1	D 256
ft·lbf/in. of notch	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.2	1.5	1.0	1.5	
~~Deflection temperature, min:~~												
~~at 1820-kPa [264-psi] fiber stress:~~												
Deflection temperature, min:												
at 1820-kPa (264-psi) fiber stress:												
°C	82	77	71	66	60	49	66	77	71	60	49	D 648
°F	180	170	160	150	140	120	150	170	160	140	120	
~~at 455-kPa [66-psi] fiber stress:~~												
at 455-kPa (66-psi) fiber stress:												
~~°C~~	~~94~~	~~88~~	~~82~~	~~77~~	~~71~~	~~66~~	~~82~~	~~82~~	~~82~~	~~77~~	~~–~~	
~~°F~~	~~200~~	~~190~~	~~180~~	~~170~~	~~160~~	~~150~~	~~180~~	~~180~~	~~180~~	~~170~~	~~–~~	
°C	94	88	82	77	71	66	82	82	82	77	–	D 648
°F	200	190	180	170	160	150	180	180	180	170	–	
Water absorption (24-h immersion), max %	1.7	1.5	1.4	1.2	1.1	1.0	1.3	1.5	1.5	1.5	1.5	D 570
~~Weight loss on heating (72 h at 82°C), max %~~	~~0.3~~	~~0.4~~	~~0.6~~	~~0.8~~	~~1.5~~	~~1.8~~	~~2.0~~	~~1.2~~	~~2.0~~	~~2.0~~	~~2.0~~	~~D 787~~
Weight loss on heating (72 h at 82°C), max %	0.3	0.4	0.6	0.8	1.5	1.8	2.0	1.2	2.0	2.0	2.0	

especially at low temperatures. The grades are classified in accordance with their physical properties as specified in Table 1.

5. Ordering Information

5.1 Purchase orders for, or inquiries about, the materials described in this specification shall identify the following:

5.1.1 The number of this specification and the required type and grade chosen from Table 1, for example, D 787 Type 1, Grade 1.

5.1.2 Supplementary requirements in accordance with this specification if necessary.

5.1.3 Color and opacity within the limits defined in 6.4.

5.1.4 Particle form and size if choice is available.

5.1.5 Such other requirements as may be agreed between the seller and the purchaser.

6. Materials and Manufacture

6.1 Materials supplied under this specification shall be ethyl cellulose plastics in the form of pellets unless otherwise specified.

6.2 Material 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.

6.3 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.

6.4 The color and transparency or opacity of items fabricated under the conditions recommended by the manufacturer of the material shall be comparable within commercial match tolerances to the color and transparency or opacity of samples submitted in advance by the manufacturer and approved by the purchaser.