



Designation: **D787—12 D787 – 18**

## Standard Specification for Ethyl Cellulose Molding and Extrusion Compounds<sup>1</sup>

This standard is issued under the fixed designation D787; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

*This standard has been approved for use by agencies of the U.S. 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 standard. The English values given are for information only.

1.3 The following precautionary statement pertains only to the Test Methods portion, Section ~~109~~ 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, health, and ~~health~~ environmental practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There is no known ISO equivalent to this specification.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

2.1 ASTM Standards:<sup>2</sup>

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

D570 Test Method for Water Absorption of Plastics

D618 Practice for Conditioning Plastics for Testing

D638 Test Method for Tensile Properties of Plastics

D648 Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position

D785 Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials

D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

D883 Terminology Relating to Plastics

D1505 Test Method for Density of Plastics by the Density-Gradient Technique

D3641 Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials

D3892 Practice for Packaging/Packing of Plastics

### 3. Terminology

3.1 Terms in this specification are in accordance with Terminology D883.

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

4.1.1 A typical call out of material covered by this specification would contain the number of this specification and the required type and grade chosen from Table 1, for example, D787 Type 1, Grade 1.

<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 Aug. 1, 2012/April 1, 2018. Published August 2012/April 2018. Originally approved in 1944. Last previous edition approved in 2009/2012 as D787 – 09-12. DOI: 10.1520/D0787-12.10.1520/D0787-18.

<sup>2</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.

\*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<sup>6</sup> 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	D792
Hardness (Rockwell) R scale, min	110	110	105	105	100	95	105	80	75	75	50	D785
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	D638
psi	6500	6000	5400	4800	4500	3800	4000	3500	3000	3300	2900	
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	D256
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):												
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	D256
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:												
°C	82	77	71	66	60	49	66	77	71	60	49	D648
°F	180	170	160	150	140	120	150	170	160	140	120	
at 455-kPa (66-psi) fiber stress:												
°C	94	88	82	77	71	66	82	82	82	77	–	D648
°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	D570
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	

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## 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, D787 Type I, 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.

## 5. Materials and Manufacture

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

5.2 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.

5.3 These materials may possibly contain colorants in the nominal amounts ordinarily employed, but such additives shall not alter the ability of the materials to meet the specified properties employed. Only those materials of this kind that meet the properties specified are covered by this standard.

5.4 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 by the manufacturer.

## 6. Physical Requirements

6.1 Test specimens of the material shall conform to the requirements prescribed in **Table 1**.

6.2 Molded specimens for those tests requiring them shall be prepared as described in Section **H09**.

7.3 Flow temperature of a given compound shall be within  $\pm 5^\circ\text{C}$  of the flow temperature designated in the contract or order.

6.3 Conformance to the requirements of this specification shall be determined by means of the tests identified in Section **H10** unless otherwise specified.