Designation: D 3275 – 00

Standard Classification for E-CTFE-Fluoroplastic Molding, Extrusion, and Coating Materials[1]

This standard is issued under the fixed designation D 3275; 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 classification covers melt processible molding, extrusion, and coating materials of ethylene-chlorotrifluoroethylene (E-CTFE) fluoroplastics. The resin is a copolymer of ethylene and chlorotrifluoroethylene containing approximately 80 weight % of chlorotrifluoroethylene.

1.2 The values stated in SI units, as detailed in IEEE/ASTM SI 10, are to be regarded as the standard.

1.3 The following precautionary statement pertains only to the test methods portion, Section 11 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—Although this specification and ISO 12086-1 (1995) and ISO 12086-2 (1995) differ in approach or detail, data obtained using either are technically equivalent.

2. Referenced Documents

2.1 *ASTM Standards:*

D 150 Test Methods for A-C Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials[2]

D 618 Practice for Conditioning Plastics for Testing[3]

D 638 Test Method for Tensile Properties of Plastics[3]

D 792 Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement[3]

D 883 Terminology Relating to Plastics[3]

D 1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer[3]

D 1600 Terminology for Abbreviated Terms Relating to Plastics[3]

D 1708 Test Method for Tensile Properties of Plastics By Use of Microtensile Specimens[3]

D 2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)[4]

D 3892 Practice for Packaging/Packing of Plastics[4]

D 4000 Classification System for Specifying Plastic Materials[4]

D 4591 Test Method for Determining Temperatures and Heats of Transitions of Fluoropolymer by Differential Scanning Calorimetry[5]

IEEE/ASTM SI 10 Standard for the Use of the International System of Units (SI): The Modern Metric System[6]

3. Terminology

3.1 *Definitions:* Definitions of terms used in this specification shall be in accordance with Terminology D 883.

3.1.1 *lot*, *n*—one production run or a uniform blend of two or more production runs.

3.2 *Abbreviations:*Abbreviations are in accordance with Terminology D 1600.

4. Classification

4.1 ECTFE materials are classified into groups according to their physical appearance. The groups are further divided into classes based on melt flow rate. These classes are subdivided into grades as shown in the Table E-CTFE.

An example of a material of this classification system is given as follows: ECTFE 01 1 1

where:

01 = ECTFE powder
1 = low melt flow
2 = properties in accordance with Table E-CTFE (Grade 1)

[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 20.15.12).

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[2] *Annual Book of ASTM Standards,* Vol 10.01.

[3] *Annual Book of ASTM Standards,* Vol 08.01.

[4] *Annual Book of ASTM Standards,* Vol 08.02.

[5] *Annual Book of ASTM Standards*, Vol 08.03.

[6] *Annual Book of ASTM Standards*, Vol 14.02.

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

TABLE E–CTFE

Group	Class	Description	Grade	Melt Flow Rate,[A] g/10 min	Specific Gravity,[B] 23/23°C	Tensile Strength,[C,D] min, MPa	Elongation,[D,E] min, %	Melting Point, °C,[F] min	Oxygen Index,[G] min, %	Dielectric Constant,[H] max, 10^6 Hz	Dissipation Factor,[I] max, 10^6 Hz
01 powder	1	Low melt flow rate	1	0.05–1.50	1.65–1.71	40	200	240	60	2.6	0.015
	2	Medium melt flow rate	1	1.51–6.0	1.65–1.71	40	200	240	60	2.6	0.015
	3	High melt flow rate	1	6.1–25	1.65–1.71	40	200	240	60	2.6	0.015
	0	Other	0								
02 pellet	1	Low melt flow rate	1	0.05–1.50	1.65–1.71	40	200	240	60	2.6	0.015
	2	Medium melt flow rate	1	1.51–6.0	1.65–1.71	40	200	240	60	2.6	0.015
	3	High melt flow rate	1	6.1–25	1.65–1.71	40	200	240	60	2.6	0.015
	0	Other	0								
00	0	Other	0								

[A] See 11.2 for test method for above parameters.
[B] See 11.4 for test method for above parameters.
[C] See 11.5 for test method for above parameters.
[D] At 23 ± 2°C (73.4 ± 3.6°F).
[E] See 11.5 for test method for above parameters.
[F] See 11.3 for test method for above parameters.
[G] See 11.7 for test method for above parameters.
[H] See 11.6 for test method for above parameters.
[I] See 11.6 for test method for above parameters.

4.1.1 To facilitate incorporation of future material, the other category for Group (00), Class (0) and Grade (0) are shown in Table E-CTFE.

5. Ordering Information

5.1 The purchase order or inquiry for these materials shall state the classification callout. For example, D 3275 ECTFE 01 1 2.

5.2 Further definition, as may be required for the following, shall be on the basis of agreement between the seller and the purchaser:

5.2.1 Nominal Melt-Flow Rate.

6. General Requirements

6.1 The material covered by this specification shall conform to the requirements prescribed in Table E-CTFE when tested by the procedures specified herein.

7. Detail Requirements

7.1 Test specimens prepared in accordance with Section 10 shall conform to the requirements prescribed for the particular class.

8. Sampling

8.1 Sampling must be statistically adequate to satisfy the requirements of 12.4.

9. Number of Tests

9.1 One set of test specimens as prescribed in Section 11 shall be considered sufficient for testing each sample. The average result of the specimens tested shall conform to the requirements of this specification.

10. Specimen Preparation

10.1 *Test Specimens*:

10.1.1 Prepare test moldings 3.18 ± 0.3 mm (0.125 ± 0.012 in.) thick between two 0.38 to 0.51 mm (0.015 to 0.020 in.) thick chromium-plated ferrotype plates. Use a "picture frame" type compression molding chase with inner dimensions of 178 by 178 mm (7 by 7 in.) and having a thickness suitable to produce the required molded sheet. Use a charge of resin sufficient to provide the thickness sheet specified.

10.1.2 Place the mold chase on top of a chromium-plated ferrotype plate. Charge a quantity of resin sufficient to produce a 3.18 ± 0.30-mm (0.125 ± 0.012-in.) sheet in a diagonal pattern from corner to corner forming an "X" pattern. Place the other chromium-plated ferrotype plate on top of the resin charge and place the assembly in a compression molding press which has been heated to 264 ± 3°C (507 ± 5.4°F). Apply a pressure of 0.34 MPa (50 psi) and hold for 4 min. Increase pressure to 1.72 MPa (250 psi) and hold for 1 min followed by increasing the pressure to not less than 2.24 MPa (325 psi) and holding for 5 min. Remove the chase assembly from the press and immediately quench it in an ice-water bath, vigorously agitating the chase. Remove the ferrotype plates, keeping the chase and molded sheet in the ice water bath until quenching is complete.

11. Test Methods

11.1 *Conditioning*:

11.1.1 For tests of specific gravity, tensile properties, oxygen index, and electrical properties, condition the molded test specimens in accordance with Procedure A of Practice D 618, with the exception that only 4-h conditioning is required.

11.1.2 Conduct tests at the standard laboratory temperatures of 23 ± 2°C (73.4 ± 3.6°F) for determination of specific gravity, tensile properties, and electrical properties. Since the resin does not absorb water, the maintenance of constant humidity during testing is not necessary. Conduct tests for melt