Designation: D5205 – 16

Standard Classification System and Basis for Specification for Polyetherimide (PEI) Materials[1]

This standard is issued under the fixed designation D5205; 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 U.S. Department of Defense.

1. Scope*

1.1 This classification system covers unfilled, filled, and reinforced polyetherimide materials suitable for injection molding and extrusion.

1.2 This classification system is not intended for the selection of materials, but only as a means to call out plastic materials to be used for the manufacture of parts. The selection of these materials is to be made by personnel with expertise in the plastics field where the environment, inherent properties of the materials, performance of the parts, part design, manufacturing process, and economics are considered.

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

1.4 Polyetherimide materials, being thermoplastic, are reprocessable and recyclable. This classification system allows for the use of those polyetherimide materials, provided that all specific requirements of this classification system are met.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 The following precautionary caveat pertains only to the test methods portion, Section 12, 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.* Specific precautionary statements are given at the end of 5.4.

NOTE 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

D150 Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation

D257 Test Methods for DC Resistance or Conductance of Insulating Materials

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

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

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

D883 Terminology Relating to Plastics

D1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer

D1600 Terminology for Abbreviated Terms Relating to Plastics

D2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)

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

D5630 Test Method for Ash Content in Plastics

D5740 Guide for Writing Material Standards in the Classification Format

D7209 Guide for Waste Reduction, Resource Recovery, and

[1] This 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**

Use of Recycled Polymeric Materials and Products (Withdrawn 2015)[3]
E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
E662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials
2.2 *Military Standards:*[4]
MIL-P-46184 Plastic Molding and Extrusion Materials, Polyetherimide (PEI).
MIL-M-24519 Molding Plastics, Electrical, Thermoplastic
2.3 *Underwriters Laboratories Standards:*[5]
UL 94 Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

3. Terminology

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

3.2 *Abbreviation*—The polyetherimide materials will be designated "PEI" as specified in Terminology D1600.

4. Classification

4.1 Unfilled polyetherimide materials are classified into groups according to their composition. These groups are subdivided into classes and grades as shown in Table PEI.

NOTE 2—An example of this classification system is given as follows. The designation ASTM D5205 PEI 0114 indicates the following:

PEI = polyetherimide as found in Terminology D1600,
01 = polyetherimide (group),
1 = general purpose (class), and
4 = requirements given in Table PEI (grade).

4.1.1 To facilitate incorporation of future or special materials the "other" category (0) for group, class, and grade is shown in Table PEI. The basic properties of these materials can be obtained from Tables A or B as they apply.

4.2 Reinforced, pigmented, filled, and lubricated versions of polyetherimide materials are classified in accordance with Tables PEI and A or B. Table PEI is used to specify the unreinforced material and Table A or B is used to specify the property requirements after the addition of reinforcements, pigments, fillers, or lubricants at the nominal level indicated (see 4.2.1).

4.2.1 A single letter shall be used to indicate the major category of the reinforcement, along with two numbers that indicate the percentage of additive(s) by mass, with the tolerances as tabulated as follows:

Category	Material	Tolerance (Based on the Total Mass)
C	Carbon and graphite fiber-reinforced	±2 percentage points
G	Glass-reinforced	
	< 15 % glass content	±2 percentage points
	> 15 % glass content	±3 percentage points
L	Lubricants (such as PTFE, graphite, silicone, and molybdenum disulfide)	Depends upon material and process—to be specified
M	Mineral-reinforced	±2 percentage points
R	Reinforced-combination/ mixtures of reinforcements or other fillers/reinforcements	±3 percentage points based on the total reinforcement

NOTE 3—If necessary, additional requirements are specified using suffixes as described in Section 5. Any special tolerances, when levels are below 5 %, are to be specified. Ash content of filled or reinforced materials are determined using Test Method D5630 where applicable.

4.2.2 Specific requirements for reinforced, filled, or lubricated polyetherimide materials shall be shown by a six-character designation. The designation will consist of the letter "A" or "B" and the five digits comprising the cell numbers for the property requirements in the order as they appear in Tables A or B.

4.2.2.1 Although the values listed are necessary to include the range of properties available in existing materials, this does not imply that every possible combination of the properties exists or can be obtained.

4.2.3 When the grade of the basic materials is not shown, or is not important, the use of "O"-grade classification shall be used for reinforced materials in this system.

NOTE 4—An example of this classification for a polyetherimide material is given as follows. The designation ASTM D5205 PEI0110G10A48266 would indicate the following material requirements:

PEI 0110 = general-purpose polyetherimide from Table PEI,
G10 = glass reinforced at nominal 10 % level,
A = Table A property requirements,
4 = 110-MPa tensile strength, min,
8 = 13790-MPa flexural modulus, min,
2 = 4 g/10 min; melt flow, min,
6 = 205-MPa flexural strength, min, and
6 = 230°C deflection temperature, min.

If no properties are specified, the designation would be ASTM D5205 PEI0110G10A00000.

5. Suffixes

5.1 When additional requirements are needed that are not covered by the basic requirements or cell-table requirements, 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 are to be used for additional requirements as appropriate. Additional suffixes will be added to that standard as test methods and requirements are developed and requested.

5.3 Electrical requirements are designated by a suffix which uses the letter E followed by two digits. These digits refer to use of Table 1.

[3] The last approved version of this historical standard is referenced on www.astm.org.
[4] Available from Standardization Documents Order Desk, Bldg. 4 Section D, Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.
[5] Available from Underwriters Laboratories (UL), 2600 N.W. Lake Rd., Camas, WA 98607-8542, http://www.ul.com.

TABLE 1 Electrical Detail Requirements

NOTE 1—Resin samples should be dried 4 h at 160°C in an air-circulating oven before molding specimens to be used in these tests.

Property	Condition[A]	Units	A	B	C	D	E
Dielectric constant,[B] max	48/50 + D24/23						
1 KHz, 50 % RH, 23°C		...	3.2	3.7	3.7	3.8	...
1 MHz		...	...	...	...	...	3.5
Dissipation factor,[B] max	48/50 + D24/23						
1 KHz, 50 % RH, 23°C		...	0.0015	0.0016	0.0017	0.0017	...
2450 MH, 50 % RH, 23°C		...	0.003	...	...	...	...
1 MH, 50 % RH, 23°C		...	...	...	...	...	0.007
Volume resistivity,[C] min	24/23/50	ohm-cm	10^{16}	10^{16}	10^{16}	10^{16}	...
Dielectric strength,[D] min (1.6-mm thickness, in oil, S/T)	48/ 50 + 96/23/50	KV/mm (V/mil)	23.6	23.0	22.0	21.0	17.0
Specific gravity[E]	...	...	1.27	1.34	1.42	1.51	...

[A] In accordance with Practice D618.
[B] See Test Methods D150.
[C] See Test Methods D257.
[D] See Test Methods D149.
[E] See Test Method D792 (tolerance ± 0.02).

First Digit
0 = specimen to be specified by user
1 = specimens as appropriate for test methods as defined in Table 1
Second Digit
0 = to be specified by user
1 = meets requirements of Table 1, Column A
2 = meets requirements of Table 1, Column B
3 = meets requirements of Table 1, Column C
4 = meets requirements of Table 1, Column D
5 = meets requirements of Table 1, Column E

5.4 Flammability requirements are designated by a suffix that uses the letter F followed by two digits. (**Warning—**By publication of this classification system and its use of flammability ratings, ASTM does not intend that their use in any way reflects hazards presented under actual fire conditions.)

First Digit
0 = to be specified by user,
1 = product is tested according to UL94 at 3.05-mm minimum thickness,
2 = product is tested according to UL94 at 1.47-mm minimum thickness,
3 = product is tested according to UL94 at 0.71-mm minimum thickness,
4 = product is tested according to Test Method D2863,
5 = product is tested according to Test Method E662.
Second Digit
0 = To be specified by user
1 = 94V-0 flammability class
2 = 94V-1 flammability class
3 = 94V-2 flammability class
4 = 94-5V flammability class
5 = Oxygen index 44 % minimum
6 = Specific optical density, flaming mode, D4 ≤ 2, D max ≤ 50.

6. General Requirements

6.1 The plastic compositions shall be uniform and shall conform to the requirements specified herein.

TABLE PEI Polyetherimide Materials Detail Requirements

NOTE 1—The values listed were developed for "natural colors." Pigments or other additives, or both, can alter these properties.

Group	Description	Class	Description	Grade	Description[A]	Flow-Rate,[B] Test Method D1238, g/10, min	Specific Gravity, Test Method D792	Deflection[C] Temperature (DTUL), min, Test Method D648, °C, min	Tensile[D] Strength, Test Method D638, MPa, min	Flexural[E] Strength, Test Methods D790, MPa, min	Flexural[E] Modulus, Test Methods D790, MPa, min
01	Polyetheri-	1	General-Purpose	1		< 2	1.25–1.30	194	103	152	3030
	mide			2		2–8	1.25–1.30	194	103	152	3030
				3		6–12	1.25–1.30	194	103	152	3030
				4		10–16	1.25–1.30	194	103	152	3030
				5		15–22	1.25–1.30	194	103	152	3030
				6		20–30	1.25–1.30	192	90	138	2900
				7		> 30	1.25–1.30	190	83	138	2900
				0	Other	...	...	...	...	...	...
		2	Impact-Modified	1		< 2	1.22–1.28	180	83	117	2410
				2		2–8	1.22–1.28	180	83	117	2410
				3		6–12	1.22–1.28	180	83	117	2410
				4		10–16	1.22–1.28	180	83	117	2410
				5		15–22	1.22–1.28	180	83	117	2410
				6		20–30	1.22–1.28	180	69	103	2280
				7		> 30	1.22–1.28	180	69	103	2280
				0	Other	...	...	...	...	...	...
		0	Other	0	Other	...	...	...	...	...	...

Group	Description	Class	Description	Grade	Description[A]	Flow-Rate,[B] Test Method D1238, g/10, min	Specific Gravity, Test Method D792	Deflection[C] Temperature (DTUL), min, Test Method D648, °C, min	Tensile[D] Strength, Test Method D638, MPa, min	Flexural[E] Strength, Test Methods D790, MPa, min	Flexural[E] Modulus, Test Methods D790, MPa, min
02	PEI Chemical Resistant	1	General-Purpose	1		<2	1.25–1.30	198	93	128	2760
				2		2–8	1.25–1.30	198	93	128	2760
				3		6–12	1.25–1.30	198	93	128	2760
				4		10–16	1.25–1.30	198	93	128	2760
				5		15–22	1.25–1.30	198	93	128	2760
				6		20–30	1.25–1.30	196	90	124	2760
				7		> 30	1.25–1.30	196	90	124	2760
				0	Other	...	...	...	...	...	...
		2	Impact-Modified	1		< 2	1.22–1.28	184	69	90	2070
				2		2–8	1.22–1.28	184	69	90	2070
				3		6–12	1.22–1.28	184	69	90	2070
				4		10–16	1.22–1.28	184	69	90	2070
				5		15–22	1.22–1.28	184	69	90	2070
				6		20–30	1.22–1.28	184	69	90	2070
				7		> 30	1.22–1.28	184	69	90	2070
				0	Other	...	...	...	...	...	...
		3	High-Heat Resistant	1		< 2	1.27–1.32	215	97	145	2760
				2		2–8	1.27–1.32	215	97	145	2760
				3		6–12	1.27–1.32	215	97	145	2760
				4		10–16	1.27–1.32	215	97	145	2760
				5		15–22	1.27–1.32	215	97	145	2760
				6		20–30	1.27–1.32	215	97	145	2760
				7		> 30	1.27–1.32	215	97	145	2760
				0	Other	...	...	...	...	...	...
		4	High-Heat Impact-Modified	1		< 2	1.23–1.30	200	69	103	2070
				2		2–8	1.23–1.30	200	69	103	2070
				3		6–12	1.23–1.30	200	69	103	2070
				4		10–16	1.23–1.30	200	69	103	2070
				5		15–22	1.23–1.30	200	69	103	2070
				6		20–30	1.23–1.30	200	69	103	2070
				7		> 30	1.23–1.30	200	69	103	2070
		0	Other	0	Other	...	...	...	...	...	...
03	PEI Heat-Resistant	1	General-Purpose	1		< 2	1.27–1.31	210	103	145	2760
				2		2–8	1.27–1.31	210	103	145	2760
				3		6–12	1.27–1.31	210	103	145	2760
				4		10–16	1.27–1.31	210	103	145	2760
				5		15–22	1.27–1.31	210	103	145	2760
				6		20–30	1.27–1.31	210	90	131	2760
				7		> 30	1.27–1.31	210	90	131	2760
				0	Other	...	...	...	...	...	...
		2	Impact-Modified	1		< 2	1.22–1.28	196	69	110	2070
				2		2–8	1.22–1.28	196	69	110	2070
				3		6–12	1.22–1.28	196	69	110	2070
				4		10–16	1.22–1.28	196	69	110	2070
				5		15–22	1.22–1.28	196	69	110	2070
				6		20–30	1.22–1.28	196	69	110	2070
				7		> 30	1.22–1.28	196	69	110	2070
				0	Other	...	...	...	...	...	...
		3	High-Heat	1		< 2	1.28–1.32	225	103	138	2760
				2		2–8	1.28–1.32	225	103	138	2760
				3		6–12	1.28–1.32	225	103	138	2760
				4		10–16	1.28–1.32	225	103	138	2760
				5		15–22	1.28–1.32	225	103	138	2760
				6		20–30	1.28–1.32	225	103	138	2760
				7		> 30	1.28–1.32	225	103	138	2760
				0	Other	...	...	...	...	...	...
		4	High-Heat Impact-Modified	1		< 2	1.24–1.28	210	69	97	2070
				2		2–8	1.24–1.28	210	69	97	2070
				3		6–12	1.24–1.28	210	69	97	2070
				4		10–16	1.24–1.28	210	69	97	2070
				5		15–22	1.24–1.28	210	69	97	2070
				6		20–30	1.24–1.28	210	69	97	2070
				7		> 30	1.24–1.28	210	69	97	2070
				0	Other	...	...	...	...	...	...
		0	Other	0	Other	...	...	...	...	...	...

Group	Description	Class	Description	Grade	Description[A]	Flow-Rate,[B] Test Method D1238, g/10, min	Specific Gravity, Test Method D792	Deflection[C] Temperature (DTUL), min, Test Method D648, °C, min	Tensile[D] Strength, Test Method D638, MPa, min	Flexural[E] Strength, Test Methods D790, MPa, min	Flexural[E] Modulus, Test Methods D790, MPa, min
04	PEI—Flexible	1	General-Purpose	1		< 2	1.16–1.20	N/A[F]	34	52	690
	Resistant			2		2–8	1.16–1.20	N/A[F]	34	52	690
				3		6–12	1.16–1.20	N/A[F]	34	52	690
				4		10–16	1.16–1.20	N/A[F]	34	52	690
				5		15–22	1.16–1.20	N/A[F]	34	52	690
				6		20–30	1.16–1.20	N/A[F]	34	52	690
				7		> 30	1.16–1.20	N/A[F]	34	52	690
				0	Other	...	...	...	...	...	...
		2	Semirigid	1		< 2	1.16–1.20	N/A[F]	21	14	69
				2		2–8	1.16–1.20	N/A[F]	21	14	69
				3		6–12	1.16–1.20	N/A[F]	21	14	69
				4		10–16	1.16–1.20	N/A[F]	21	14	69
				5		15–22	1.16–1.20	N/A[F]	21	14	69
				6		20–30	1.16–1.20	N/A[F]	21	14	69
				7		> 30	1.16–1.20	N/A[F]	21	14	69
				0	Other	...	...	...	...	...	...
		3	Nonrigid	1		< 2	1.10–1.20	N/A[F]	7	7	<69
				2		2–8	1.10–1.20	N/A[F]	7	7	<69
				3		6–12	1.10–1.20	N/A[F]	7	7	<69
				4		10–16	1.10–1.20	N/A[F]	7	7	<69
				5		15–22	1.10–1.20	N/A[F]	7	7	<69
				6		20–30	1.10–1.20	N/A[F]	7	7	<69
				7		> 30	1.10–1.20	N/A[F]	7	7	<69
				0	Other	...	...	...	...	...	...
		0	Other	0	Other	...	...	...	...	...	...

[A] No descriptions are listed unless needed to describe a special grade under the class. All other grades are listed by requirements.
[B] *Conditions*—Method A, 6.7 kg, 2.0955-mm inside diameter orifice:

Group-Class	Test Temperatures, °C
011, 012, 021, 022	337
023, 024, 031, 032, 033, 034	367
041, 042, 043	295

[C] Specimens 6.4 mm tested at 1.82 MPa.
[D] Type 1 bar, speed 5.1 mm/min.
[E] Method I, Procedure A, speed = 2.5 mm/min, span-to-depth ratio 16/1 (tangent modulus).
[F] "N/A" indicates the particular data so designated is considered "Not Applicable" to the product being considered.

TABLE A Detail Requirements Filled or Reinforced PEI, or Both

NOTE 1—Resin samples should be dried 4 h at 160°C in an air-circulating oven before molding specimens to be used in these tests and before determining melt-flow rate.

Designation Order	Property/ASTM Test Method	Units	0	1	2	3	4	5	6	7	8	9
1	Tensile strength, min, D638,[A] Type I bar, 0.2 in./min	MPa	[B]	25	55	80	110	135	165	190	220	[C]
2	Flexural modulus, min, D790[D]	MPa	[B]	690	1720	3450	5170	6900	8620	10340	13790	[C]
3	Flow Rate, min, D1238[E]	g/10 min	[B]	1	4	7	10	13	16	20	24	[C]
4	Flexural strength, min, D790[D]	MPa	[B]	30	65	100	135	170	205	240	275	[C]
5	Deflection Temperature, min, D648[F]	°C	[B]	180	190	200	210	220	230	240	250	[C]

[A] Type I bar, speed = 5.1 mm/min.
[B] Unspecified.
[C] Specify value. If a specific value is required, it must appear on the drawing or contract, or both.
[D] Method 1, Procedure A; speed = 2.55 mm/min.
[E] *Conditions*—Method A, 6.7 kg, 2.0955-mm inside diameter orifice:

Group-Class	Test Temperatures, °C
011, 012, 021, 022	337
023, 024, 031, 032, 033, 034	367
041, 042, 043	295

[F] 6.4-mm thick specimen tested at 1.82 MPa.

TABLE B Detail Requirements Unreinforced/Unfilled PEI

NOTE 1—Resin samples should be dried 4 h at 160°C in an air-circulating oven before molding specimens to be used in these tests and before determining melt-flow rate.

Designation Order	Property/ASTM Test Method	Units	0	1	2	3	4	5	6	7	8	9
1	Tensile strength, min, D638[A]	MPa	[B]	14	25	40	55	65	80	95	110	[C]
2	Flexural modulus, min, D790[D]	MPa	[B]	7	30	65	340	690	1380	2070	2760	[C]
3	Flow Rate, min, D1238[E]	g/10 min	[B]	2	6	10	14	18	22	26	30	[C]
4	Flexural strength, min, D790[D]	MPa	[B]	7	30	65	90	110	130	150	170	[C]
5	Deflecting Temperature, min, D648[FG]	°C	[B]	170	180	190	200	210	220	230	240	[C]

[A] Type I bar, speed = 5.1 mm/min.
[B] Unspecified.
[C] Specify value. If a specific value is required, it must appear on the drawing or contract, or both.
[D] Method 1, Procedure A; speed = 2.55 mm/min.
[E] *Conditions*—Method A, 6.7 kg, 2.0955-mm inside diameter orifice:

Group-Class	Test Temperatures, °C
011, 012, 021, 022	337
023, 024, 031, 032, 033, 034	367
041, 042, 043	295

[F] 6.4-mm thick specimen tested at 1.82 MPa.

7. Detail Requirements

7.1 The various materials shall conform to the requirements prescribed in the tables and suffix requirements as they apply.

7.2 For the purpose of determining conformance, all specified limits for a specification (line callout) based on this classification system are absolute limits, as defined in Practice E29.

7.2.1 With the absolute method, an observed value or a calculated value is not rounded, but is to be compared directly with the specified limiting value. Conformance or nonconformance is based on this comparison.

8. Sampling

8.1 Sampling shall be statistically adequate to satisfy requirements of 13.4. A batch or lot is contrued as a unit of manufacture as prepared for shipment and can consist of a blend of two or more "production runs."

9. Number of Tests

9.1 The number of tests shall be consistent with the requirements of 13.4.

10. Specimen Preparation

10.1 Unless otherwise specified, test specimens shall be prepared by injection molding in accordance with Practice D3641 employing the following conditions:

	Minimum Mold Temperature, °C	Minimum Stock Temperature, °C
Unfilled and unreinforced	120	360
Filled or reinforced, or both	150	390

11. Conditioning

11.1 Condition test specimens at least 40 h at 23°C and 50 % relative humidity as defined in 3.1.2 of Practice D618.

12. Test Methods

12.1 Determine the properties enumerated in this classification system using the referenced test methods.

13. Inspection and Certification

13.1 Inspection and certification of the material supplied with reference to a specification based on this classification system shall be for conformance to the requirements specified herein.

13.2 Lot-acceptance inspection shall be the basis on which acceptance or rejection of the lot is made. The lot-acceptance shall consist of: flow rate.

13.3 Periodic check inspection shall consist of the tests specified for all requirements of the material under this classification system. Inspection frequency shall be adequate to ensure the material is certifiable in accordance with 13.4.

13.4 Certification shall be that the material was manufactured by a process in statistical control, sampled, tested, and inspected in accordance with this classification system, and that the average values meet the requirements of the specification (line callout).

NOTE 5—The ASTM publication *Manual on Presentation of Data and Control Chart Analysis, 8th Edition*,[6], provides detailed information about statistical process control.

13.5 A report of the test results shall be furnished when requested. The report shall consist of results of the lot acceptance inspection for the shipment and the results of the most recent periodic check inspection.

14. Packing, Packaging, and Package Marking

14.1 Provisions of Practice D3892 apply for packing, packaging, and marking of containers for plastic materials.

15. Keywords

15.1 classification; line-call-out; polyetherimide resins

[6] Available from ASTM International Headquarters. Order Catalog Number: MNL-8TH-EB.

APPENDIX

(Nonmandatory Information)

X1. CROSS REFERENCES

X1.1 The following cross references between government specifications and Classification System D5205 are provided for information purposes only.

TABLE X1.1 Cross References Designations for Classification System D5205 and Government Specifications

Government Specification	Classification System D5205
MIL-P-46184	
Type I (unfilled)	PEI0113 E01 F05 F06
Type II Class 1 (glass reinforced)	PEI0110 G10 A49203 E02 ZU 434OMPa
Class 2 (glass reinforced)	PEI0110 G20 A99103 E03 ZU 5800MPa
Class 3 (glass reinforced)	PEI0110 G30 A99103 E04 ZK 159MPa ZU 7600MPa
MIL-M-24519B	
Type: GLT-10F (glass reinforced)	PEI0110 G10 A00290 E05 EF085 ZN180
GLT-20F (glass reinforced)	PEI0110 G20 A00190 E05 EF085 ZN195
GLT-30F (glass reinforced)	PEI0110 G30 A00190 E05 EF085 ZN215

SUMMARY OF CHANGES

Committee D20 has identified the location of selected changes to this standard since the last issue (D5205 – 10) that may impact the use of this standard. (September 1, 2016)

(1) Added statement allowing recycled material to Scope.
(2) In 2.1, added reference to D5740, Standard Guide for Writing Material Standards in the Classification D4000 Format.
(3) In 2.1, added reference to D7209, Guide for Waste Reduction, Resource Recovery, and Use of Recycled Polymeric Materials and Products.
(4) Revised Note 3 for clarity of intent.
(5) Rewrote Section 5 to improve consistency with wording of D5740, Standard Guide for Writing Material Standards in the Classification D4000 Format.
(6) Corrected placement of footnote A in Table PEI and applied footnote F to all appropriate cells.
(7) Eliminated footnote B as unnecessary on all tables.
(8) Rewrote footnote D on Tables A and B.
(9) Rewrote 8.1 and 8.2 to correct reference and to use wording of D5740 in 8.1.
(10) In 11.1, eliminated tolerances in order to avoid possible misinterpretation of the requirements.
(11) Revised 13.2 to use wording of D5740.
(12) Revised 13.4 to reflect current practice and added Note 8.
(13) Revised 13.5 to accommodate use of recycled material.