



Designation: D 4067 – 96

Standard Specification for Reinforced and Filled Polyphenylene Sulfide (PPS) Injection Molding and Extrusion Materials¹

This standard is issued under the fixed designation D 4067; 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 reinforced and filled polyphenylene sulfide materials suitable for injection molding and extrusion.

1.2 This specification 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 specification are those required to identify the compositions covered. There may be other requirements necessary to identify particular characteristics important to specific applications. These will be agreed upon between the user and the supplier by using the suffixes as given in Section 5.

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

1.5 This precautionary statement pertains only to the test method portion of this specification, section 13. *This standard does not purport to address all of the safety concerns 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.*

2. Referenced Documents

2.1 ASTM Standards:

D 149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies²

D 150 Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials²

D 256 Test Methods for Impact Resistance of Plastics and Electrical Insulating Materials³

D 257 Test Methods for DC Resistance or Conductance of Insulating Materials²

D 495 Test Method for High-Voltage, Low-Current, Dry Arc Resistance of Solid Electrical Insulation²

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing³

D 638 Test Method for Tensile Properties of Plastics³

D 648 Test Method for Deflection Temperature of Plastics Under Flexural Load³

D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials³

D 792 Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement³

D 883 Terminology Relating to Plastics³

D 1600 Terminology for Abbreviated Terms Relating to Plastics³

D 1897 Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials³

D 1898 Practice for Sampling of Plastics³

D 3418 Test Method for Transition Temperatures of Polymers by Thermal Analysis⁴

D 3892 Practice for Packaging/Packing of Plastics⁴

D 4000 Classification System for Specifying Plastic Materials⁴

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specification⁵

E 595 Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment⁶

E 662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials⁷

F 814 Test Method for Specific Optical Density of Smoke Generated by Solid Materials for Aerospace Applications⁶

¹ This specification is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials (Section D20.15.17).

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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 14.02.

⁶ Annual Book of ASTM Standards, Vol 15.03.

⁷ Annual Book of ASTM Standards, Vol 04.07.

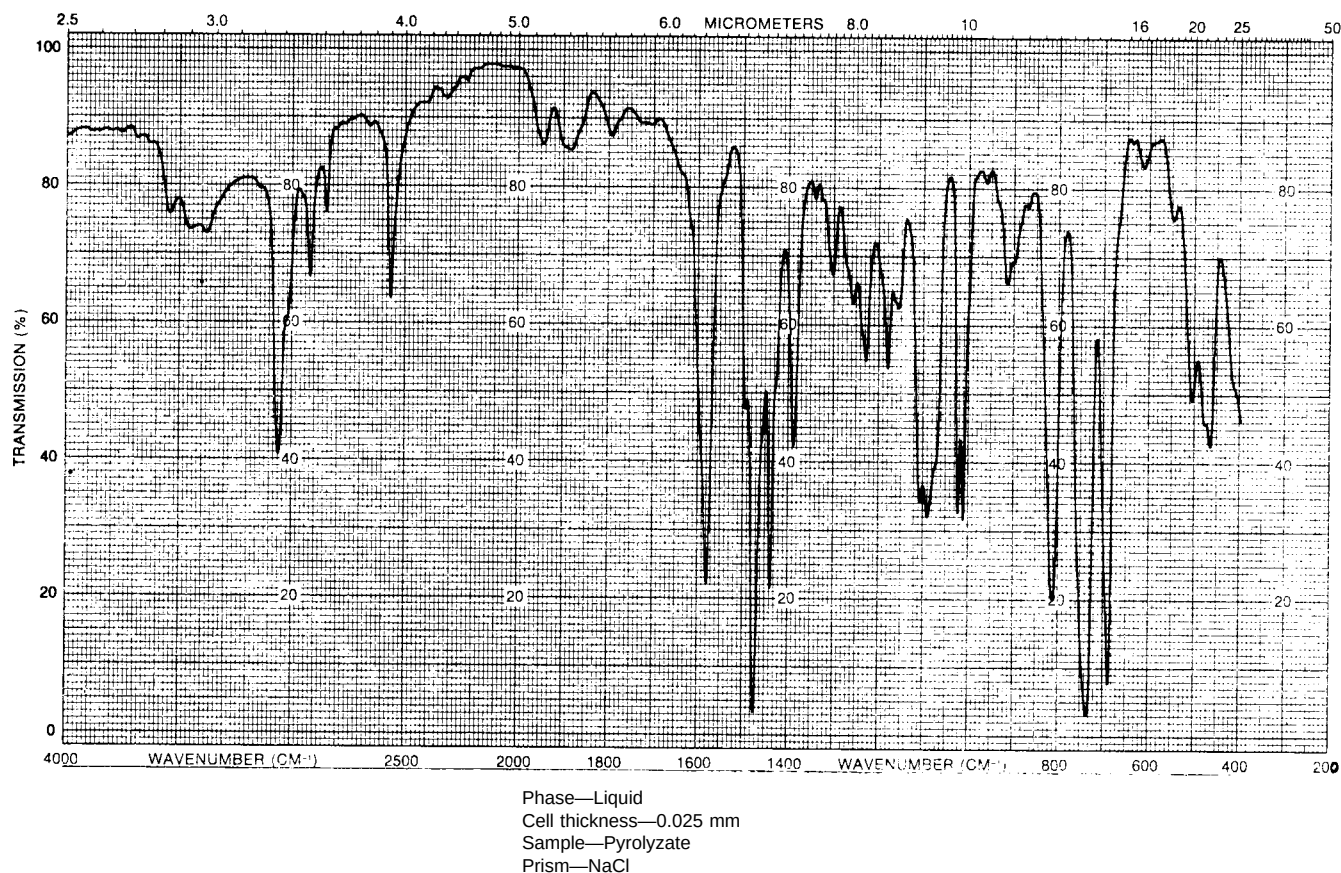


FIG. 1 Infrared Spectrum of Polyphenylene Sulfide Pyrolyzate

TABLE 1 Detail Requirements

Property	Condition ^A	Units	A	B	C	D	E	F	G	H	I
Dielectric constant ^B max	E-48/50 + D24/23										
1 KHz	E-48/50 + D24/23		4.0	4.0	4.2	4.5	4.8	5.3	6.8	5.8	9.0
1 MHz	E-48/50 + D24/23		4.0	4.0	4.1	4.4	4.5	4.8	6.3	6.3	9.0
Dissipation factor ^B max	E-48/50 + D24/23										
1 KHz	E-48/50 + D24/23		0.002	0.002	0.004	0.008	0.02	0.08	0.10	0.10	0.10
1 MHz	E-48/50 + D24/23		0.007	0.007	0.007	0.010	0.02	0.01	0.03	0.03	0.10
Volume resistivity ^C , min	C-24/23/50	ohm-cm	1×10^{16}	1×10^{14}	1×10^{16}	1×10^{14}	1×10^{15}	1×10^{15}	1×10^{15}	1×10^{15}	1×10^{14}
Dielectric strength ^D , min	E-48/50 + 96/23/50	KV/mm (Y/mil)	14.6 (375)	14.6 (375)	13.6 (350)	11.7 (300)	11.7 (300)	11.7 (300)	11.7 (300)	11.7 (300)	11.7 (300)
Arc resistance ^E , min		second	30	10	30	0	150	150	150	180	150
Comparative tracking index ^A		Y	130	130	130	130	200	200	150	230	200
^F min											

^A In accordance with Methods D 618.

^B ASTM Test Method D 150.

^C ASTM Test Method D 257.

^D ASTM Test Method D 149.

^E ASTM Test Method D 495.

^F UL Method 746A.

2.2 Military Standards:⁸

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes

MIL-P-46174 (MR) Plastic Molding Material, Polyphenylene Sulfide, Glass Fiber Reinforced

MIL-M-24519 Molding Plastics, Electrical, Thermoplastic

2.3 Underwriters Laboratories:⁹

UL Standard 94 Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

UL Standard 746A Polymeric Materials—Short-Term Property Evaluation

⁸ Available from Standardization Documents, Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁹ Available from Underwriters Laboratories, Inc. Publications Stock, 333 Pfingsten Road, Northbrook, IL 60062.