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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 3640D

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Superseding AMS 3640C

PLASTIC MOLDINGS
Melamine-Formaldehyde, Mineral Filled

1. SCOPE:

1.1 Form: This specification covers a melamine/formaldehyde resin in the form of compression or transfer moldings.

1.2 Application: Primarily for parts used in electrical systems, such as ignition rotors and terminal blocks, requiring high arc resistance, dielectric strength, and heat resistance.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D149 - Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM D256 - Impact Resistance of Plastics and Electrical Insulating Materials
ASTM D495 - High-Voltage, Low-Current Dry Arc Resistance of Solid Electrical Insulation
ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D792 - Specific Gravity and Density of Plastics by Displacement

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication: Shall be a mineral-filled, melamine/formaldehyde resin fabricated by compression or transfer molding to meet the requirements of 3.2.

3.1.1 Color and Condition: Shall be brown to gray, opaque, and with a lustrous finish.

3.2 Properties: Moldings shall conform to the following requirements; tests shall be performed on the moldings supplied and in accordance with specified test methods, insofar as practicable:

3.2.1	Flexural Strength, min	8000 psi (55 MPa)	ASTM D790
3.2.2	Impact Strength, Notched Izod, per unit of notch, min	0.275 ft-lb per in. (14.5 J/m)	ASTM D256 Method A (4.3.1.4)
3.2.3	Dielectric Strength, min Short Time Test		4.5.1
3.2.3.1	At 23°C ± 3 (73°F ± 5)	400 V per mil (15,750 V/mm)	
3.2.3.2	At 100°C ± 1 (212°F ± 2)	350 V per mil (13,780 V/mm)	
3.2.4	Arc Resistance, min	120 sec	ASTM D495
3.2.5	Water Absorption, 24 hr test, max	0.15%	ASTM D570
3.2.6	Specific Gravity at (25°/25° C) (77°/77°F), max	2.20	ASTM D792 Method A
3.2.7	Shrinkage, max	0.002 in. per in. (0.002 mm/mm)	4.5.2

3.2.8 Weathering: When specified, moldings shall have weather resistance acceptable to purchaser, determined by a procedure agreed upon by purchaser and vendor.

3.2.9 Corrosion: Moldings shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service. Discoloration of metals shall not be considered objectionable. Method of test and standards for acceptance shall be as agreed upon by purchaser and vendor.

3.3 Quality: Moldings, as received by purchaser, shall be uniform in quality and condition, smooth, and free from imperfections detrimental to usage of the moldings.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of moldings shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the moldings conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for flexural strength (3.2.1), impact strength (3.2.2), dielectric strength at 23°C (73°F), (3.2.3), and specific gravity (3.2.6) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as perproduction tests and shall be performed prior to or on the initial shipment of moldings to a purchaser, when a change in material, processing, or both requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: shall be as follows:

4.3.1 For Acceptance Tests: Sufficient moldings shall be taken at random from each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three. When the molding is of such size or shape that suitable specimens cannot be obtained, separate specimens shall be supplied upon request. Such specimens shall be molded from the same batch of molding powder and under conditions representative of those used in making the moldings.

4.3.1.1 A lot shall be all moldings of the same size and configuration or the same part number from the same batch of molding powder produced in one continuous run and presented for vendor's inspection at one time but shall not exceed 200 lb (90 kg). A lot may be packaged and delivered in smaller quantitites under the basic lot approal provided lot identification is maintained.

4.3.1.2 A batch of molding powder shall be all powder produced in one continuous set of operations.

4.3.1.3 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6.1 shall state that such plan was used.

4.3.1.4 Specimens for impact strength (3.2.2) shall be nominally 1/2 x 1/8 in. (12 x 3 mm).

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample moldings shall be approved by purchaser before moldings for production use are supplied, unless such approval be waived by purchaser. Results of tests on production moldings shall be essentially equivalent to those on the approved sample moldings.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production moldings which are essentially the same as those used on the approved sample moldings. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material, processing, or both and, when requested, sample moldings. Production moldings made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Dielectric Strength: Shall be determined in accordance with ASTM D149, short time test at 23°C ± 3 (73°F ± 5) and at 100°C ± 1 (212°F ± 2) on molded discs nominally 0.075 in. (1.88 mm) thick and 4 in. (100 mm) in diameter.

4.5.2 Shrinkage: Shall be determined on discs as in 4.5.1 measured before and after heating for 8 hr ± 0.25 at 105°C ± 1 (220°F ± 2).

4.6 Reports:

4.6.1 The vendor of moldings shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the moldings conform to the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 3640D, vendor's compound number, form, size or part number, and quantity.

4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 3640D, contractor or other direct supplier of moldings, supplier's compound number, part number, and quantity. When moldings for making parts are produced or purchased by the parts vendor, that vendor shall inspect each lot of moldings to determine conformance to the requirements of this specification and shall include in the report either a statement that the moldings conform or copies of laboratory reports showing the results of tests to determine conformance.