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INTERNATIONAL
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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 3644B

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Superseding AMS 3644A

PLASTIC ROD AND BAR, POLYIMIDE
Molded

1. SCOPE:

1.1 Form:

This specification and its supplementary detail specifications cover a polyimide plastic in the form of molded rod and bar.

1.2 Application:

These products have been used typically for parts requiring low coefficient of friction, thermal resistance, and toughness up to 260 °C (500 °F) but usage is not limited to such applications.

1.3 Classification:

The requirements specified herein and in the applicable detail specification define each product on the basis of the filler used with the same base polyimide polymer. The presence of filler and the material used as filler are specified in the title of each detail specification.

1.4 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of referenced publications shall be the issue in effect on the date of the purchase order.

Printed in U.S.A.
91-0942/ EG

2.1 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 695 Compressive Properties of Rigid Plastics
ASTM D 695M Compressive Properties of Rigid Plastics (Metric)
ASTM D 790 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D 790M Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials (Metric)
ASTM D 792 Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D 1708 Tensile Properties of Plastics by Use of Microtensile Specimens
ASTM D 2714 Calibration and Operation of the Alpha Model LFW-1 Friction and Wear Testing Machine

2.2 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1 DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Detail Specifications:

The requirements for a specific material shall consist of all requirements specified herein in addition to requirements specified in the applicable detail specification. In case of conflict between requirements of this basic specification and an applicable detail specification, requirements of the detail specification shall govern.

3.2 Material:

Moldings shall be manufactured from virgin, unplasticized polyimide polymer, unfilled or filled as specified in the applicable detail specification, ready for machining and use.

3.3 Color:

Shall be natural and may vary, as specified in the applicable detail specification, depending on the filler material used.

3.4 Properties:

Shall conform to the requirements of this specification and the applicable detail specification. Tests shall be performed on the product supplied and in accordance with specified test methods:

3.4.1 (R) Dimensional Stability: Dimensions of raw stock or fabricated parts shall not change more than 0.0015 inch per inch (0.0015 mm/mm), measured at 20 to 30 °C (68 to 86 °F) before and after being held for 24 hours ± 0.5 at 260 °C ± 5 (500 °F ± 9) in air. Before initial measurement, specimens shall be conditioned at 150 °C ± 5 (302 °F ± 9) for 24 hours ± 0.5.

3.5 (R) Quality:

The product, as received by purchaser, shall be uniform in quality and condition, smooth, and free from foreign materials and from imperfections detrimental to usage of the product.

3.6 Tolerances:

Shall be as shown in Table 1; measurements shall be made at 20 to 30 °C (68 to 86 °F) except that closer temperature control may be required for large dimensions:

TABLE 1A - Diameter Tolerances, Inches

Nominal Diameter Inches	Tolerances plus only
0.250 to 1.000, incl	0.025
Over 1.000 to 2.000, incl	0.050
Over 2.000 to 3.500, incl	0.070
Over 3.500	As specified by purchaser

TABLE 1B - Diameter Tolerances, Millimeters

Nominal Diameter Millimeters	Tolerances plus only
6.35 to 25.40, incl	0.64
Over 25.40 to 50.80, incl	1.27
Over 50.80 to 88.90, incl	1.78
Over 88.90	As specified by purchaser

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:
(R)

The vendor of the product shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for tensile strength at 23 °C (73 °F), elongation at 23 °C (73 °F), and specific gravity at 23 °C (73 °F) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the product to a purchaser, when a change in ingredients and/or processing 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, contracting officer, or request for procurement.

4.3 Sampling and Testing:
(R)

Shall be as follows:

4.3.1 For Acceptance Tests: Each lot of product shall be sampled at random to provide sufficient product 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.

4.3.1.1 A lot shall be all molded product produced in a single production run from the same batch of polymer and presented for vendor's inspection at one time. A lot may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained. An inspection lot may contain product of varying sizes but shall not exceed 200 pounds (91 kg) of product.

4.3.1.2 When a statistical sampling plan has been agreed upon by purchaser
(R) and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.5 shall state that such plan was used.

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

4.4 Approval:

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

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production product which are essentially the same as those used on the approved sample product. 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 ingredients and/or processing and, when requested, sample product. Production product made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

The vendor of the product shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3644B and its applicable detail specification number and revision letter, if any, vendor's product identification, size or part number, and quantity.

4.6 Resampling and Retesting:
(R)

If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional samples for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Packaging shall be accomplished to ensure that the product, during shipment and storage, will not be permanently distorted and will be protected against damage from exposure to weather or any other normal hazard.