

PLASTIC ROD AND BARS, 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: Primarily for parts requiring low coefficient of friction, thermal resistance, and toughness up to 260°C (500°F).
- 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.

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

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

ASTM D695 - Compressive Properties of Rigid Plastics

ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

ASTM D792 - Specific Gravity and Density of Plastics by Displacement

ASTM D1708 - Tensile Properties of Plastics by Use of Microtensile Specimens

ASTM D2714 - Calibration and Operation of the Alpha Model LFW-1 Friction and Wear Testing Machine

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

|                         |                     |
|-------------------------|---------------------|
| Tensile Strength        | ASTM D1708          |
| Elongation              | ASTM D1708          |
| Compressive Strength    | ASTM D695           |
| Flexural Strength       | ASTM D790           |
| Coefficient of Friction | 4.5.1               |
| Specific Gravity        | ASTM D792, Method A |

3.4.1 Dimensional Stability: Dimensions of raw stock or fabricated parts shall not change more than 0.001 in. per in. (0.001 mm/mm), measured at 20° - 30°C (68° - 86°F) before and after being held for 24 hr + 0.5 at 260°C + 5 (500°F + 10) in air. Before initial measurement, specimens shall be conditioned at 150°C + 5 (300°F + 10) for 24 hr + 0.5.

- 3.5 Quality: The product, as received by purchaser, shall be uniform in quality and condition, clean, smooth, and free from foreign materials and from imperfections detrimental to usage of the product.
- 3.6 Tolerances: Shall be as follows; measurements shall be made at 20° - 30°C (68° - 86°F) except that closer temperature control may be required for large dimensions:

TABLE I

| Nominal Diameter<br>Inches | Diameter Tolerances, Inch<br>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 I (SI)

| Nominal Diameter<br>Millimetres | Diameter Tolerances, Millimetres<br>plus only |
|---------------------------------|-----------------------------------------------|
| 6.25 to 25.00, incl             | 0.62                                          |
| Over 25.00 to 50.00, incl       | 1.25                                          |
| Over 50.00 to 87.50, incl       | 1.75                                          |
| Over 87.50                      | As specified by purchaser                     |

#### 4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of the product 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 product conforms to the requirements of this specification.

#### 4.2 Classification of Tests:

- 4.2.1 Acceptance Tests: Tests to determine conformance to requirements for tensile strength at 23°C (73°F), elongation at 23°C (73°F), and specific gravity at 23°C (73°F) 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 and the applicable detail specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of the product 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: Each lot of product shall be sampled at random to provide sufficient material 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 and delivered in small quantities under the basic lot approval provided lot identification is maintained. An inspection lot may contain product of varying sizes but shall not exceed 200 lb (90 kg) of product.

4.3.1.2 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.

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

4.4 Approval:

4.4.1 Sample material shall be approved by purchaser before material for production use is supplied, unless such approval be waived by purchaser. Results of tests on production material 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 material which are essentially the same as those used on the approved sample material. 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 material. Production material made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Coefficient of Friction: Shall be determined in accordance with ASTM D2714, using a conforming polymeric block against a rotating steel ring without lubricant.