

AEROSPACE MATERIAL SPECIFICATION

SAE

AMS 3617C

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Superseding AMS 3617B

Submitted for recognition as an American National Standard

NYLON PLASTIC MOLDINGS AND EXTRUSIONS

1. SCOPE:

- 1.1 Form: This specification covers one type of nylon thermoplastic resin in the form of moldings and extrusions.
- 1.2 Application: Primarily for parts requiring high strength and resistance to aircraft fuels and lubricants up to 120°C (248°F).
- 1.3 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 applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

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

- ASTM D 256 - Impact Resistance of Plastics and Electrical Insulating Materials
- ASTM D 570 - Water Absorption of Plastics
- ASTM D 638 - Tensile Properties of Plastics
- ASTM D 638M - Tensile Properties of Plastics (Metric)
- ASTM D 648 - Deflection Temperature of Plastics Under Flexural Load
- 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 3418 - Transition Temperatures of Polymers by Thermal Analysis

2.2 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.2.1 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be a nylon resin with any necessary fillers, modifiers, and plasticizers necessary to meet the requirements of 3.1.1 and 3.2.

3.1.1 Color: Shall be light cream, opaque.

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

3.2.1 Tensile Strength, minimum ASTM D 638
or ASTM D 638M

Nominal Thickness		
Inches	Millimeters	
Up to 0.375, excl	Up to 9.52, excl	9.0 ksi (62 MPa)
0.375 and over	9.52 and over	11.0 ksi (76 MPa)

3.2.2 Elongation, minimum ASTM D 638
or ASTM D 638M

Nominal Thickness		
Inches	Millimeters	
Up to 0.187, excl	Up to 4.75, excl	50%
0.187 and over	4.75 and over	25%

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| 3.2.3 Flexural Modulus of Elasticity (Tangent), minimum | 310 ksi
(2137 MPa) | ASTM D 790
or ASTM D 790M |
| 3.2.4 Impact Resistance per unit of notch, minimum | 0.8 foot pounds/inch
(42.7 J/m) | ASTM D 256,
Method A |
| 3.2.5 Deflection Temperature at 264 psi (1.82 MPa) fiber stress, minimum | 66°C (151°F) | ASTM D 648 |
| 3.2.6 Water Absorption (24 hour immersion), weight gain, maximum | 1.5% | ASTM D 570 |
| 3.2.7 Specific Gravity at 73°/73°F (23°/23°C) | 1.13 - 1.15 | ASTM D 792,
Method A |
| 3.2.8 Melting Point
Ø | 250° - 260°C
(482° - 500°F) | ASTM D 3418 |
| 3.2.9 <u>Weathering</u> : When specified, the product shall have weather resistance acceptable to the purchaser, determined by a procedure acceptable to purchaser. | | |
| 3.2.10 <u>Corrosion</u> : The product shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service, determined by a procedure acceptable to purchaser. | | |
| 3.3 <u>Quality</u> : 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. | | |
| 4. <u>QUALITY ASSURANCE PROVISIONS</u> : | | |
| 4.1 <u>Responsibility for Inspection</u> : 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.
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| 4.2 <u>Classification of Tests</u> : | | |
| 4.2.1 <u>Acceptance Tests</u> : Tests for tensile strength (3.2.1), elongation (3.2.2), specific gravity (3.2.7), and melting point (3.2.8) are acceptance tests and shall be performed on each lot. | | |
| 4.2.2 <u>Preproduction Tests</u> : 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: Shall be as follows:

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4.3.1 For Acceptance Tests: Sufficient product 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.

4.3.1.1 When the product is of such size or shape that suitable specimens cannot be obtained, separate specimens, injection molded from the same batch of molding powder and under conditions representative of those used in making the product, shall be supplied upon request.

4.3.1.2 A lot shall be all product from the same batch of molding powder processed in one continuous run and presented for vendor's inspection at one time.

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

4.3.1.4 When a statistical sampling plan has 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 4.5 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.