

AEROSPACE MATERIAL SPECIFICATION



AMS 3617D

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Superseding AMS 3617C

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:

These products have been used typically for parts requiring high strength and resistance to aircraft fuels and lubricants up to 120 °C (248 °F), but usage is not limited to such applications.

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, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

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 DODSSP, Subscription Services 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 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 requirements shown in Table 1, Table 2, Table 3, 3.2.9 and 3.2.10; tests shall be performed on the product supplied and in accordance with specified ASTM methods, insofar as practicable:

3.2.1 Tensile Strength: Shall be as shown in Table 1.

TABLE 1 - Minimum Tensile Strength

Nominal Thickness Inches	Nominal Thickness Millimeters	Value	Test Method
Up to 0.375, excl	Up to 9.52, excl	9.0 ksi (62 MPa)	ASTM D 638 or
0.375 and over	9.52 and over	11.0 ksi (76 MPa)	ASTM D 638M

3.2.2 Elongation: Shall be as shown in Table 2.

TABLE 2 - Minimum Elongation

Nominal Thickness Inches	Nominal Thickness Millimeters	Value	Test Method
Up to 0.187, excl	Up to 4.75, excl	50%	ASTM D 638 or
0.187 and over	4.75 and over	25%	ASTM D 638M

TABLE 3 - Properties

Paragraph	Property	Value	Test Method
3.2.3	Flexural Modulus of Elasticity (Tangent), min	310 ksi (2137 MPa)	ASTM D 790 or ASTM D 790M
3.2.4	Impact Resistance per unit of notch, min	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, min	66 °C (151 °F)	ASTM D 648
3.2.6	Water Absorption (24 hour immersion), weight gain, max	1.5%	ASTM D 570
3.2.7	Specific Gravity at 73/73 °F (23/23 °C)	1.13 to 1.15	ASTM D 792, Method A
3.2.8 (R)	Melting point	250 to 265 °C (482 to 509 °F)	ASTM D 3418 DTA or DSC (see 8.2)

3.2.9 Weather Resistance: When specified, the product shall have weather resistance acceptable to purchaser, determined by a procedure acceptable to purchaser.

3.2.10 Corrosion: 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 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.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of the product shall supply all samples for required 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 (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 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the product by a manufacturer, 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:

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 manufacturer'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 manufacturer, 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 manufacturer.

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 Manufacturer 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. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, manufacturer 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 supplier 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 3617D, manufacturer's compound number, form and size or part number, and quantity.

4.6 Resampling and Retesting:

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 specimens 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 Product Identification:

5.1.1 Molded Parts: Each molded part of suitable size shall have the part number molded or permanently impressed therein. If size precludes integral marking, parts of each different part number shall be packed in separate, suitable containers marked with the part number.

5.1.2 Extrusions: Shall be marked near one end with AMS 3617D and the manufacturer's designation. If extrusions are supplied in coils, the marking shall appear at the outside end of the coil.