Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3617A
Superseding AMS 3617

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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 mechanical parts requiring high strength and resistance to aircraft fuels and lubricants at temperatures up to 250° F (121° C).

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

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc. 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 D256 - Impact Resistance of Plastics and Electrical Insulating Materials
ASTM D570 - Water Absorption of Plastics
ASTM D638 - Tensile Properties of Plastics
ASTM D648 - Deflection Temperature of Plastics Under Flexural Load
ASTM D789 - Nylon Injection Molding and Extrusion Materials
ASTM D790 - Flexural Properties of Plastics
ASTM D792 - Specific Gravity and Density of Plastics by Displacement

2.3 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: Shall be a nylon resin with any necessary fillers, modifiers, and plasticizers necessary to meet the other technical requirements of this specification.

3.2 Color: Shall be light cream, opaque.

3.3 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:

3.3.1 Tensile Strength, min — ASTM D638

Nominal Thickness		
Inches	(Millimetres)	
Up to 0.375, excl	(Up to 9.52, excl)	9,000 psi (62.1 MPa)
0.375 and over	(9.52 and over)	11,000 psi (75.8 MPa)

3.3.2 Elongation, min — ASTM D638

Nominal Thickness		
Inches	(Millimetres)	
Up to 0.187, excl	(Up to 4.75, excl)	50%
0.187 and over	(4.75 and over)	25%

3.3.3 Flexural Modulus of Elasticity (Tangent), min: 310,000 psi (2137 MPa) — ASTM D790

3.3.4 Impact Resistance, min, Ft-lb per inch of notch (N·m per metre of notch): 0.8 (42.7) — ASTM D256, Method A

3.3.5 Deflection Temperature, min at 264 psi (1.82 MPa) fiber stress: 150° F (65.6° C) — ASTM D648

3.3.6 Water Absorption (24 hr immersion), max: 1.5% — ASTM D570

3.3.7 Specific Gravity at 73.4/73.4° F (23/23° C): 1.13 - 1.15 — ASTM D792, Method A

3.3.8 Melting Point: 482° - 500° F (250° - 260° C) — ASTM D789

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

3.3.10 Corrosion: The product shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service.

3.4 Quality: The product shall be uniform in quality and condition, clean, smooth, and free from foreign materials and from internal and external imperfections detrimental to fabrication, appearance, or performance of parts.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems 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 the following requirements are classified as acceptance or routine control tests and shall be performed on each lot of product:

Property	Paragraph Reference
Tensile Strength	3.3.1
Elongation	3.3.2
Specific Gravity	3.3.7
Melting Point	3.3.8

4.2.2 Qualification Tests: Tests to determine conformance to all technical requirements of this specification are classified as qualification or periodic control tests and may be the basis for approval of the product (See 4.4.1).

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

4.3 Sampling: Sufficient material shall be taken from each lot to perform all required tests in triplicate. When the product is of such size or shape that suitable specimens cannot be obtained, separate specimens shall be supplied upon request. Such specimens shall be injection molded from the same batch of molding powder and under conditions representative of those used in making the product.

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

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

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. 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 any change is necessary 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 and processing and, when requested, sample revised material. No production material made by the revised procedure shall be shipped prior to receipt of reapproval.

4.5 Reports:

4.5.1 The vendor of the product shall furnish with each shipment three copies of 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 of this specification. This report shall include the purchase order number, material specification number and its revision letter, vendor's compound number, form and size or part number, and quantity.

4.5.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

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 and no additional testing shall be permitted. 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 3617A and the manufacturer's designation. If extrusions are supplied in coils, the marking shall appear at the outside end of the coil.

5.2 Packaging and Package Identification:

5.2.1 Packaging shall be accomplished in such a manner as to ensure that the product, during shipment and storage, will not be distorted and will be protected against damage from exposure to moisture, weather, or any normal hazard.

5.2.2 Each package shall be permanently and legibly marked to show the following information:

NYLON MOLDINGS (or EXTRUSIONS)
AMS 3617A
SIZE OR PART NUMBER_____
COLOR_____
QUANTITY_____
PURCHASE ORDER NUMBER_____
MANUFACTURER'S IDENTIFICATION_____

5.2.3 Packages shall be prepared for shipment in accordance with commercial practice to ensure carrier acceptance and safe transportation to the point of delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.2.4 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-794, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.2.3 will be acceptable if it meets the requirements of Level C.