SAE The Engineering Resource For Advancing Mobility®
400 COMMONWEALTH ORIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3628C
Superseding AMS 3628B

Issued 1-31-64
Revised 4-1-85

PLASTIC EXTRUSIONS AND MOLDINGS, POLYCARBONATE
General Purpose

1. SCOPE:

1.1 Form: This specification covers a polycarbonate resin in the form of extrusions and moldings.

1.2 Application: Primarily for mechanical parts requiring high impact strength from -55° to +135°C (-65° to +275°F), clarity, high strength, and dimensional stability. These products are sensitive to some solvents; each application must be evaluated on its own merits.

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

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 D621 - Deformation of Plastics Under Load
ASTM D635 - Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM D638 - Tensile Properties of Plastics
ASTM D648 - Deflection Temperature of Plastics Under Flexural Load
ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D792 - Specific Gravity and Density of Plastics by Displacement

REAFFIRMED 10/91

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 Material: Shall be a polycarbonate resin with fillers, plasticizers, and modifiers necessary to meet the requirements of 3.2 and 3.3.

3.2 Color: Shall be transparent with a water-white or light straw color, unless otherwise ordered.

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 Properties:		ASTM D638, Speed C
	Tensile Strength, min	8000 psi (55 MPa)	
	Yield Strength, min	7000 psi (48 MPa)	
	Elongation at Rupture, min	60%	
3.3.2 Ø	Flexural Modulus of Elasticity (tangent), min	300,000 psi (2070 MPa)	ASTM D790
3.3.3	Flexural Strength, min	11,000 psi (75 MPa)	ASTM D790
3.3.4	Impact Strength:		ASTM D256, Method A
3.3.4.1	Notched, min	12 ft-lb/in. (640 J/m)	
3.3.4.2	Unnotched, min	60 ft-lb/in. (3200 J/m)	
3.3.5	Deflection Temperature at 264 psi (1.82 MPa) fiber stress, min	128°C (262°F)	ASTM D648
3.3.6	Time of Burning, max	5 sec	ASTM D635
3.3.7	Water Absorption, 24 hr immersion at 23°C ± 1 (73°F ± 2), max	0.35%	ASTM D570

3.3.8	Specific Gravity at 23°/23°C (73°/73°F)	1.19 - 1.21	ASTM D792
3.3.9	Deformation Under Load, max		ASTM D621
3.3.9.1	4000 psi (27.5 MPa) at 25°C ± 1 (77°F ± 2)	0.3%	
3.3.9.2	4000 psi (27.5 MPa) at 70°C ± 1 (158°F ± 2)	1.1%	

3.3.10 Corrosion: The product shall not have a corrosive effect on other Ø materials when exposed to conditions normally encountered in service, determined by a procedure agreed upon by purchaser and vendor. Discoloration of metals shall not be considered objectionable. Method of test and standards for acceptance test shall be as agreed upon by purchaser and vendor.

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

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all Ø 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 4.5. 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 properties (3.3.1), impact strength (3.3.4), and specific gravity (3.3.8) 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 are classified as preproduction tests and shall be performed prior to or on the initial shipment of a 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: 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. 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.

4.3.1.1 A lot shall be all product of the same size and configuration or the same part number from the same batch of molding powder produced in one continuous run and presented for vendor's inspection at one time. An inspection lot shall not exceed 200 lb (90 kg). A lot may be packaged or delivered in small quantities under the basic lot approval provided lot identification is maintained.

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

4.3.1.3 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 4.5.1 shall state that such plan was used.

4.3.1.4 Specimens for impact strength (3.3.4) shall be nominally 1/2 x 1/8 in. (12 x 3 mm).

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

4.3.2.1 Specimens for time-of-burning test (3.3.6) shall be nominally 1/8 in. (3 mm) thick.

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 material.

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 Reports:

4.5.1 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 of this specification. This report shall include the purchase order number, AMS 3628C, vendor's compound number, form, size or part number, and quantity.

4.5.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 3628C, contractor or other direct supplier of material, supplier's compound number, 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 either a statement that the material conforms or 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 Moldings: Each molding of suitable size shall have the part number molded or permanently impressed therein. If size or configuration precludes integral marking, moldings of each different part number shall be packaged in separate containers marked with the part number.

5.1.2 Extrusions: Each extrusion shall be marked near one end or, if coiled, near the outside end with the manufacturer's designation and AMS 3628C.

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 other normal hazard.

4.5 Reports:

4.5.1 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 of this specification. This report shall include the purchase order number, AMS 3628C, vendor's compound number, form, size or part number, and quantity.

4.5.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 3628C, contractor or other direct supplier of material, supplier's compound number, 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 either a statement that the material conforms or 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 Moldings: Each molding of suitable size shall have the part number molded or permanently impressed therein. If size or configuration precludes integral marking, moldings of each different part number shall be packaged in separate containers marked with the part number.

5.1.2 Extrusions: Each extrusion shall be marked near one end or, if coiled, near the outside end with the manufacturer's designation and AMS 3628C.

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 other normal hazard.