

**AEROSPACE
MATERIAL
SPECIFICATION**

Submitted for recognition as an American National Standard

SAE AMS 3611C

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Superseding AMS 3611B

**PLASTIC SHEET, POLYCARBONATE
General Purpose**

1. SCOPE:

1.1 Form: This specification covers a polycarbonate resin in the form of sheet.

1.2 Application: Primarily for parts such as aircraft heating ducts, cabin liners, fairings, storage boxes, and, decorative laminates requiring high impact strength, high strength, and dimensional stability. This material is 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 D149 - Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

ASTM D150 - A-C Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials

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2.2 (Cont'd.)

- ASTM D256 - Impact Resistance of Plastics and Electrical Insulating Materials
- ASTM D257 - D-C Resistance or Conductance of Insulating Materials
- ASTM D570 - Water Absorption of Plastics
- 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
- ASTM D1637 - Tensile Heat Distortion Temperature of Plastic Sheet

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.
- 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.

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|--|----------------------------|------------------------|
| 3.3.1 <u>Tensile Properties:</u> | | ASTM D638,
Speed C |
| Tensile Strength, min | 8000 psi (55 MPa) | |
| Elongation at Rupture, min | 60% | |
| 3.3.2 Modulus of Elasticity
in Tension, min | 285,000 (1965 MPa) | ASTM D638,
Speed B |
| 3.3.3 Flexural Strength, min | 11,000 psi (75 MPa) | ASTM D790 |
| 3.3.4 Impact Strength, min
Unnotched at 25°C (77°F) | 60 ft-lb/in.
(3200 J/m) | ASTM D256,
Method A |
| 3.3.5 <u>Heat Distortion:</u> | | ASTM D1637 |

3.3.5.1 Sheet Up to 0.060 In. (15 mm), Incl, Thick:

Tensile Heat Distortion Temperature
at 50 psi (345 kPa) Tensile
Stress and 2% Extension, min 140°C (285°F)

3.3.5.2 Sheet Over 0.060 in. (15 mm) Thick:

ASTM D648

Deflection Temperature, 264 psi
(1820 kPa) fiber stress, min 130°C (270°F)

3.3.6 Specific Gravity at 23°/23°C
(73°/73°F)

1.19 - 1.21

ASTM D792

3.3.7 Dielectric Constant at 25°C + 1
(77°F ± 2), 50% RH, and 60 cycles, min

2.75

ASTM D150

3.3.8 Dielectric Strength at 23°C + 1
(73°F ± 2), in air or oil, min360 V per mil
(14,175 V/mm)

ASTM D149
(0.125 in. [3.12 mm]
thick specimen;
short time test,
1 in. [25 mm]
electrodes)

Volume Resistivity at 23°C + 1
(73°F ± 2) and 50% RH, min1.0 x 10¹⁴ ohm-cm

ASTM D257

3.3.10 Water Absorption, 24 hr immersion
at 23°C ± 1 (73°F ± 2), max

0.35%

ASTM D570

3.3.11 Flammability

Self-extinguishing

ASTM D635

3.3.12 Corrosion: The sheet shall not have a corrosive effect on other
∅ 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 acceptance standards shall be as agreed upon by purchaser and
vendor.

3.4 Quality: Sheet, 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 sheet.

3.5 Tolerances: Thickness shall not vary more than +10% from the thickness
ordered.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of sheet 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 4.5. 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), specific gravity (3.3.6), and quality (3.4) 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 sheet 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.

4.3.1.1 A lot shall be all product produced in a single production run from the same batches of raw materials under the same fixed conditions and presented for vendor's inspection at one time.

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 4.5.1 shall state that such plan was used.

4.3.1.3 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.

4.4 Approval: