AERONAUTICAL MATERIAL SPECIFICATIONS

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AMS 3627

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Revised

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PLASTIC MOLDINGS AND EXTRUSIONS
Methyl Methacrylate
Heat Resistant

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

2. FORM: Extrusions, compression moldings, or injection moldings.

3. APPLICATION: Primarily for parts requiring good dimensional stability, improved heat resistance, a high degree of optical clarity, and good resistance to outdoor weathering. Moldings are applicable to electronic and associated equipment.

4. TECHNICAL REQUIREMENTS:

4.1 General:

4.1.1 Color and Condition: Unless otherwise specified, a colorless, transparent product shall be furnished. When so stipulated, the product shall be furnished transparent, translucent, or opaque, in the color specified.

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

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

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

4.2.1	Index of Refraction, $n \frac{73.4\ F}{D}$	1.48 to 1.50	ASTM D542-50
4.2.2	Specific Gravity, 73.4/73.4 F, max	1.20	ASTM D792-50, Method A
4.2.3	Haze, %, max	3	ASTM D1003-52, Procedure A
4.2.4	Luminous Transmittance, %, min 1/8 in. thick	91	ASTM D791-54
4.2.5	Water Absorption (24 hr immersion), max % Gain % Soluble Loss	 0.50 0.12	ASTM D570-54T
4.2.6	Heat Distortion Temperature (264 psi Fiber Stress), deg Fahr, min Moldings Extrusions	 183 162	ASTM D648-56 Heating Rate: 3.6 F per min.

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4.2.7	Tensile Strength, psi, min		ASTM D638-56T
	Moldings	8600	
	Extrusions	7300	
4.2.8	Flexural Strength, psi, min		ASTM D790-49T
	Moldings	13,000	
	Extrusions	11,000	
4.2.9	Impact Resistance, ft-lb per in. of notch, min	0.2	ASTM D256-56, Method C
4.2.10	Insulation Resistance, megohms, min	1.0×10^7	ASTM D257-57T, Fig. 3 (See Note 1)
4.2.11	Dielectric Strength, v per mil, min		ASTM D149-55T (Specimens shall be 1/8 in. thick)
	Short-time	400	
	Step-by-step	350	
4.2.12	Dielectric Breakdown, kv, min		ASTM D149-55T (See Note 2)
	Short-time	50	
	Step-by-step	45	
4.2.13	Dielectric Constant, max		ASTM D150-54T
	at 1×10^6 cycles	3.3	
	at 30×10^6 cycles	2.9	
4.2.14	Dissipation Factor, max		ASTM D150-54T
	at 1×10^6 cycles	0.03	
	at 30×10^6 cycles	0.02	
4.2.15	Flammability, in. per min., max	2.4	ASTM D635-56T (Specimens shall be 1/8 in. thick)

Note 1.

(a) Attachment of Lead Wires: Drill necessary holes and solder lead wires into the holes using a pencil-type soldering iron or gun and water-white, unactivated rosin flux, filling the hole with a plug of solder. Remove excess flux and other contaminants by rinsing in a clean mixture of 90% ethanol and 10% distilled water by volume. Air dry. Care should be exercised to avoid touching critical areas of the clean specimen with bare hands.

(b) Insulation Resistance Measurement: Mount test specimens in a circulating-air humidity chamber (provided with suitable specimen lead wire insulators on the chamber) maintained at 92% ± 2 RH and 149 F ± 4 and expose for 18 hr ± 1. Lower the humidity to 87% ± 2 RH while holding the temperature constant and stabilize the specimens at this condition for 2 - 2-1/4 hours. Apply 500 v DC between terminal leads and maintain electrification time for 1 minute. Immediately thereafter, measure insulation resistance using a megohm bridge (General Radio Type 544B or equivalent). Measurements shall be performed while the RH is 87% ± 1.

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Note 2. Test specimens shall be 1/2 in. thick by 4 in. square. They shall have two 3/16 in. diameter through holes, centrally located 1 in. apart, and perpendicular to the face of the specimens. Each specimen shall have three pairs of such holes, at random locations, spaced no closer than 1 in. apart. Holes shall be reamed to fit No. 3 American Standard tapered pins which serve as electrodes. The electrodes shall be fitted with 1/2 in. diameter spheres on the extremities, to decrease the tendency to flashover during test. Perform dielectric breakdown test in accordance with procedures and apparatus described in ASTM D149-55T.

5. 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.

6. REPORTS:

6.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the product meets the requirements of this specification. This report shall include the purchase order number, material specification number, vendor's compound number, form, size or part number, and quantity.

6.2 Unless otherwise specified, 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, 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.

7. IDENTIFICATION: Unless otherwise specified, all molded parts of suitable size shall have the part number molded or permanently impressed therein. Extrusions shall be marked near one end or, if coiled, near the outside end, with the manufacturer's identification and AMS 3627. The method of marking is optional but shall have no deleterious effect on the material or its performance. The characters shall be sufficiently stable to withstand ordinary handling.

8. PACKAGING:

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

8.2 Each package shall be permanently and legibly marked to give the following information:

SIZE OR PART NUMBER _____
COLOR _____
QUANTITY _____
PURCHASE ORDER NUMBER _____
MATERIAL SPECIFICATION AMS 3627
MANUFACTURER'S IDENTIFICATION _____

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