



AEROSPACE MATERIAL SPECIFICATION

AMS3109™

Issued 1991-04
Reaffirmed 2022-08

Primer, Adhesive, Electrodeposited
-55 to +82 °C (-67 to +180 °F)

RATIONALE

AMS3109 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. **SCOPE:**

- 1.1 Form:** This specification covers a corrosion-inhibiting, water soluble, modified epoxy primer in liquid form.
- 1.2 Application:** Primarily for use as a primer with structural adhesive bonding of metal-to-metal attachments and honeycomb panels.
- 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 latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

2.1.1 **Aerospace Material Specifications:**

AMS 2825 - Material Safety Data Sheets
AMS 4004 - Aluminum Alloy Foil, 2.5Mg - 0.25Cr (5052 - H191, Strain Hardened)
AMS 4045 - Aluminum Alloy Sheet and Plate, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr, (7075; -T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated

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Full document details: SAE AMS3109

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<https://www.sae.org/standards/content/AMS3109/>

Documents

Document Sharing Hub

2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 1475 - Density of Paint, Varnish, Lacquer, and Related Products
ASTM D 2369 - Volatile Content of Coatings

2.3 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.3.1 Federal Specifications:

MMM-A-132 - Adhesive, Heat Resistant, Airframe Structural, Metal to Metal
PPP-P-1892 - Paint, Varnish, Lacquer, & Related Materials, Packaging, Packing, and Marking of

2.3.2 Military Specifications:

MIL-T-5624 - Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-A-25463 - Adhesive, Film Form, Metallic Structural Sandwich Construction
MIL-H-83282 - Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft, Metric, NATO Code Number H-537
MIL-A-83377 - Adhesive Bonding (Structural) for Aerospace and Other Systems, Requirements for

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be a liquid, suitable for electrodeposition containing a heat-curable modified epoxy for use in the range -55° to +82°C (-67° to +180°F).

3.2 Properties: Primer shall conform to the following requirements:

3.2.1 Uncured Primer:

3.2.1.1 Nonvolatile Content: Shall not vary more than $\pm 2\%$ of the preproduction value, determined in accordance with ASTM D 2369.

3.2.1.2 Viscosity: Shall be 38 seconds ± 2 , determined at 25°C ± 1 (77°F ± 2) using a No. 2 Zahn cup.

3.2.1.3 Pot Life: Primer, allowed to stand without agitation up to 72 hours before application, shall show no evidence of skinning, gelling, or seeding. Primer that has stood for 72 hours or longer without agitation may, if necessary, be purged of skins, gels, or seeds by ultrafiltration, and the solids returned to the range established during preproduction testing by the addition of not more than 20% by volume of make-up liquid. Mixed primer shall have a working life of one year, with at least two turnovers of feed or make-up material per year, and no idle period longer than 30 successive days, or a period without agitation longer than 72 hours.

3.2.1.3.1 After liquid primer has remained without agitation for 72 hours, solids that may have settled out shall be redispersed with the standard agitation procedure to make the primer suitable for application within four hours. The standard agitation procedure consists of recirculating the primer in the tank at a pumping rate sufficient to provide a liquid flow of the fluid surface toward the weir of 10 feet (3 m) per minute.

3.2.1.4 Weight per Unit Volume: The weight of basic tank charge and the make-up charge shall not vary more than ± 0.2 pounds per gallon (± 24 g/L), determined in accordance with ASTM D 1475. The basic tank charge material shall be 9.5 - 10.5 pounds per gallon (1138 - 1258 g/L).

3.2.1.5 Toxicity: Primer shall have no toxic effect on the health of personnel during use or curing when used for the intended purpose.

3.2.2 Curing: Applied primer shall conform to the requirements of Table I and Table II after being in a constant temperature oven at $143^{\circ}\text{C} \pm 3$ ($290^{\circ}\text{F} \pm 5$) for 40 minute ± 5 .

3.3 Quality: The primer, as received by purchaser, shall be free of skins, lumps, grit, and contaminants and shall be easily mixed to a smooth homogeneous condition and after one year of storage at $10^{\circ} - 21^{\circ}\text{C}$ ($50^{\circ} - 70^{\circ}\text{F}$). When applied and cured in accordance with 4.5.2.1, the coating shall have a smooth, unpitted surface appearance.

4. QUALITY ASSURANCE PROVISION

4.1 Responsibility for Inspection: The vendor of the primer shall supply all samples for vendor's 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 primer conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for the following requirements are acceptance tests and shall be performed to represent each lot:

4.2.1.1 Viscosity (3.2.1.2),

4.2.1.2 Tensile shear at 24°C (75°F) in accordance with MMM-A-132.

4.2.1.3 Sandwich peel at 24°C (75°F) in accordance with MIL-A-25463.

4.2.1.4 Wedge crack propagation in accordance with 4.5.2.3.

TABLE I
Metal-to-Metal Specimens

Property of Joint	Test Conditions	Pre-Test Exposure Conditions	Test Method	No. of Spec.	Adhesive Strength Requirements	
					Minimum Average Value	Minimum Individual Value
Tensile Shear	75°F ± 5	None	MMM-A-132	6	4500 ksi	4000 ksi
		30 days at 120°F ± 5 and 95 – 100% relative humidity	MMM-A-132	6	3250 ksi	
		7 days ± 2 hours in MIL-H-83282 Hydraulic fluid	MMM-A-132	6	3250 ksi	
		7 days ± 2 hours in (MIL-T-5624) JP-4 fuel	MMM-A-132	6	3250 ksi	
		10 minutes at test temperature	MMM-A-132	6	2000 ksi	
Blister Detection, Tensile Shear	180°F ± 5	10 minutes at test temperature	MMM-A-132	6	3500 ksi	
	-67°F ± 5	10 minutes at test temperature	MMM-A-132	6	3250 ksi	
Fatigue Strength	75°F ± 5	None	MMM-A-132	10	3250 ksi	
	75°F ± 5 with a 750 ksi max alternating stress	None	MMM-A-132	6	75 ksi at 10 ⁶ cycles	
Creep Rupture	75°F ± 5 at 1600 ksi	None	MMM-A-132	6	192 hours, 0.015 inch max deformation	
	180°F ± 5 at 800 ksi	None	MMM-A-132	6	192 hours, 0.015 inch max deformation	
T-Peel	75°F ± 5	None	MMM-A-132	6	20 pounds force/inch width	
Wedge Crack Propagation	One to two hours at 140°F ± 5 and 95 – 100% relative humidity	None	4.5.2.3	5	0.75 inch max crack growth	