



AEROSPACE MATERIAL SPECIFICATION

AMS3116™**REV. A**

Issued 1998-07
Revised 2005-10
Reaffirmed 2023-05

Superseding AMS3116

Primer Coating: Epoxy, Chemical and Solvent Resistant
Non-Chromated, Corrosion Preventive

RATIONALE

AMS3116A has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE:

1.1 Form:

This specification covers two types of two-component, epoxy, chemical and solvent resistant primer coatings formulated primarily for spray application. These coatings are compatible with epoxy and polyurethane topcoats.

1.2 Application:

Coatings covered in this specification have typically been used on metal surfaces of commercial and general aviation aircraft where chromates are prohibited but usage is not limited to such applications.

1.3 Classification:

Coating shall be furnished in the following classes:

Class 1: High-Solids (340 grams/L maximum volatile organic content (VOC))

Class 2: Waterborne (340 grams/L maximum VOC)

1.4 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.

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Documents

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2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 1640	Corrosion Removing Compound for Aircraft Surfaces
AMS 2629	Fluid, Jet Reference
AMS 2825	Material Safety Data Sheets
AMS 3167	Solvents, Cleaning for Cleaning Prior to Application of Primer and Top Coat Materials
AMS 3819	Cloth, Cleaning for Aircraft Interior and Exterior Surfaces
AMS 4035	Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024-0), Annealed
AMS 4036	Aluminum Alloy Sheet and Plate, Alclad One Side, 4.4Cu - 1.5Mg - 0.60Mn, (Alclad One Side 2024 and 1-1/2% Alclad One Side 2024-T3 Sheet; 1-1/2% Alclad One Side 2024-T351 Plate), Solution Heat Treated
AMS 4037	Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate), Solution Heat Treated
AMS-QQ-A-250/12	Aluminum Alloy 7075, Plate and Sheet
AMS-S-8802	Sealing Compound, Temperature Resistant, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion
AS1241	Fire Resistant Hydraulic Fluid for Aircraft

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM B 117	Salt Spray (Fog) Testing
ASTM D 1200	Viscosity of Paints, Varnishes and Lacquers by Ford Viscosity Cup
ASTM D 1210	Fineness of Dispersion of Pigment - Vehicle Systems
ASTM D 1475	Standard Test Method for Density of Liquid Coatings, Inks, and Related Products
ASTM D 1544	Color of Transparent Liquids (Gardner Color Scale)
ASTM D 1640	Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
ASTM D 1849	Standard Test Method for Package Stability of Paint
ASTM D 2369	Standard Test Method for Volatile Content of Coatings
ASTM D 2803	Filiform Corrosion Resistance of Organic Coatings on Metal

2.2 (Continued):

ASTM D 3335	Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
ASTM D 3792	Standard Test Method for Water Content of Coatings by Direct Injection into a Gas Chromatograph

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 or www.assist.daps.dla.mil.

MIL-A-8625	Anodic Coatings for Aluminum and Aluminum Alloys
MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-C-8514	Coating Compound, Metal Pretreatment, Resin-Acid
MIL-DTL-81706	Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys
MIL-PRF-23699	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-PRF-85285	Coating: Polyurethane, Aircraft And Support Equipment
FED-STD-595	Colors Used in Government Procurement
FED-STD -141	Paint, Varnish, Lacquer And Related Materials: Methods Of Inspection, Sampling And Testing

2.4 U. S. Environmental Protection Agency Publications

Available from U.S. EPA, Air Quality Planning and Standards (QAQPS), Research Triangle Park, NC 27711 or www.epa.gov.

Method 24	Determination Of Volatile Matter Content, Water Content, Density, Volume Solids, And Weight Solids Of Surface Coatings
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3. TECHNICAL REQUIREMENTS:

3.1 Materials:

The primers shall consist of two components. The primers shall contain no lead, chromates, or ozone depleting chemicals.

- 3.1.1 These primers shall be suitable for air, airless, high volume low pressure (HVLP), or electrostatic spray application.

3.2 Volatile Content:

The solvents used in manufacturing and thinning prior to application shall conform to the following requirements when tested as specified in 4.5. Class 1 primers shall meet a maximum volatile organic compounds (VOC) content of 340 grams/L (2.8 lbs/gal). Class 2 primers shall be capable of water dilution to an admixed VOC of 340 grams/L (2.8 lbs/gal), maximum.

The VOC content of unthinned admixed primer coating shall be calculated as follows:

$$\text{VOC (g/l)} = A : B$$

Where:

- A = $[(100 - X_m - W_{H_2O}) : 100]$
- B = $[(1 : P_m) - (W_{H_2O} : 100,000)]$
- X_m = Solids content of the admixed primer coating (weight percent) determined in accordance with ASTM D 2369, procedure B
- P_m = Density of admixed primer coating (g/l), determined in accordance with ASTM D 1475
- W_{H_2O} = Water content of the admixed primer coating (percent by weight), determined in accordance with ASTM D 3792

Chlorinated solvents, except for para-chlorotrifluoromethylbenzene or equal, shall be prohibited from the formulation of this primer coating. Incidental cadmium and cadmium compounds shall be not greater than one part per million (ppm). The non-volatile portion shall contain not more than 0.06 percent by weight of lead metal or lead compounds.

3.3 Pigment Requirements:

The pigment of the primer coating shall be contained in component A or B.

- 3.3.1 Condition in Container: Individual components that have been allowed to stand without agitation for at least two weeks in closed containers, shall be capable of being mixed to a smooth, homogeneous, pourable condition. When tested in accordance with 4.5, components shall be free from grit, seeds, lumps, abnormal thickening, or livering and shall not show pigment flotation or settling which cannot be reincorporated by mixing. There shall be no visibly detectable particulate matter, either suspended in solution or settled on the inner surface of the container which cannot be dispersed readily by agitation, when tested in accordance with 4.5.
- 3.3.2 Fineness and Grind: The fineness of grind shall be 5, minimum, on the Hegman scale when tested in accordance with Table 2.

3.4 Properties:

- 3.4.1 Color : The color of the admixed primers shall be the natural color of the corrosion inhibiting pigments used or darker.

- 3.4.2 Viscosity: Class 1 and Class 2 primers (immediately after mixing) shall have a maximum viscosity of 30 seconds through a No. 4 Ford cup at 23 ± 3 °C (73 ± 5 °F).
- 3.4.3 Pot Life: The primer shall have 4 hours workable pot-life when mixed and used in accordance with manufacturer's instructions. At the end of the 4 hours pot life at 23 ± 3 °C (73 ± 5 °F), the primer material shall meet specification requirements of 3.5, 3.6, and 3.7.
- 3.4.4 Storage Stability: The product, when stored at 1.7 to 46 °C (35 -115 °F) for one year in the original unopened container as packaged by the manufacturer, shall meet the requirements specified herein when tested in accordance with Table 2.
- 3.4.5 Accelerated Storage Stability: The product, as packaged by the manufacturer, shall meet all requirements specified herein after 30 days at 49 ± 3 °C (120 ± 5 °F).

3.5 Properties:

- 3.5.1 Surface Appearance: The admixed primer, when reduced in accordance with manufacturer's instructions, shall have the viscosity/consistency suitable for application by conventional , HVLP, airless, air assisted and electrostatic spray (not suitable equipment in the case of water based materials). Primer manufacturer shall define the recommended viscosity range. The primer mix , shall spray satisfactorily with no sagging, running, or streaking. The dried film shall be free from grit, seeds, craters, blisters, and other surface irregularities (See 4.5.2).
- 3.5.2 Drying Time: Class 2 primers shall be tack-free within two hours and dry hard within six hours. The Class 1 primer shall be tack-free within four hours and dry hard within eight hours.
- 3.5.3 Lifting: When tested per 4.5.3, there shall be no evidence of lifting or any other film irregularity
- 3.5.4 Adhesion: When tested as specified in Table 2, the primer film shall not peel away from the substrate after 168 hours immersion in water.
- 3.5.5 Flexibility: The primer film shall exhibit a minimum impact elongation of 10% at room temperature when tested per 4.5.4.
- 3.5.6 Strippability: At least 90% of the primer film shall be stripped when tested as specified in 4.5.5.

3.6 Fluid Resistance Properties:

- 3.6.1 Water Resistance: The primer film, when topcoated and tested as specified in 4.5.6, shall withstand four days immersion in distilled water at a temperature of 49 ± 3 °C (120 ± 5 °F) without showing any softening, wrinkling, blistering, or any other coating deficiency.