SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3117

Issued 2002-01
Reaffirmed 2011-04

Primer
Zinc Molybdate

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

1. SCOPE:

1.1 Type:

This specification covers a zinc molybdate primer in the form of a liquid.

1.2 Application:

This product has been used typically as a protective coating on metals, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order form 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 2471	Anodic Treatment of Aluminum Alloys, Sulfuric Acid Process, Undyed Coating
AMS 4037	Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate), Solution Heat Treated

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS3117

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19248-2959 or www.astm.org.

ASTM D 185	Coarse Particles in Pigments, Pastes, and Paints
ASTM D 562	Consistency of Paints Using the Stormer Viscometer
ASTM D 563	Phthalic Anhydride Content of Alkyd Resins and Resin Solutions
ASTM D 1364	Water in Volatile Solvents (Fischer Reagent Titration Method)
ASTM D 1475	Density of Liquid Coatings, Ink and Related Products
ASTM D 3363	Film Hardness by Pencil Test
ASTM D 3960	Volatile Organic Compound (VOC) Content of Paints and Related Coatings

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

3.1.1 Primer (by weight): Nonvolatile portion shall be 76 to 80.8%; volatile portion shall be 19.2 to 24 percent.

3.1.1.1 Nonvolatile Components: Phthalic anhydride portion of the nonvolatile vehicle/carrier shall be 23 to 30%, determined in accordance with ASTM D 563; pigment portion shall be 54 to 58% of the primer as a whole.

3.1.1.1.1 The resin component shall be free of rosin and rosin derivatives.

3.1.1.1.2 Pigment: Shall consist of not less than 5% molybdenum in the form of zinc molybdate, and 14.5 to 16% titanium dioxide, and shall be lead and chromium free.

3.1.1.2 Volatile Component: The composition of the volatile component shall be mineral spirits and the VOC content of the primer at application shall not exceed 340 grams per liter (2.8 lbs/gal) determined in accordance with ASTM D 3960.

3.2 Properties:

Primer shall conform to the following requirements:

3.2.1 Color: Shall be light yellow, characteristic of zinc molybdate.

3.2.2 Density: Shall be 12.6 to 13.6 pounds per gallon (1.5 to 1.6 grams/mL) determined in accordance with ASTM D 1475.

3.2.3 Coarse Particles: Not more than 0.5% by weight, calculated on the basis of total solids, shall be retained on a No. 325 (45 µm) sieve, determined in accordance with ASTM D 185.

3.2.4 Water Content: Shall not exceed 2% by weight, determined in accordance with ASTM D 1364.

3.2.5 Viscosity: Shall be 75 to 91 Krebs Units, determined in with ASTM D 562.

3.2.6 Storage Stability: Primer, in a three-quarters full, closed container which has been conditioned at 125 °F ± 2 (52 °C ± 1) for one month, shall not cause corrosion of the container nor shall the primer exhibit skinning or off-odor.

3.2.7 Skinning and Livering: Shall be absent in a quarter-filled, closed container after standing for 24 hours ± 0.2 at room temperature.

3.3 Air-Drying Film Properties:

3.3.1 Drying Time: A 0.001 to 0.002 inch (25 to 51 µm) thick wet film shall air dry to the touch in not more than six hours at 77 °F ± 3.5 (25 °C ± 2) and a relative humidity not higher than 50 percent. The coating shall be suitable for recoating within eight hours.

3.3.2 Water Resistance: A wet film 0.001 to 0.002 inch (25 to 51 µm) shall be sprayed on a flat panel prepared as in 4.5.1 and cured at room temperature for a maximum of 48 hours. Immerse approximately half of the panel in room temperature distilled water for 24 hours. Upon removal from the water, the immersed film shall show no wrinkling or blistering, and shall have a minimum pencil hardness of 4H determined in accordance with ASTM D 3363. After air drying the panel for 24 hours, the film pencil hardness shall be 4H minimum, determined in accordance with ASTM D 3363.

3.3.3 Baked Film Properties:

3.3.3.1 Flexibility: A 0.001 to 0.002 inch (25 to 51 µm) wet film applied to a flat panel as in 4.5.1 shall be allowed to air dry for two hours, then baked for 24 hours at 212 to 221 °F (100 to 105 °C). The film shall not crack when the panel is bent through an angle of 180 degrees around a mandrel having a diameter of 1/8 inch (3.2 mm).

3.4 Quality:

Primer, as received by purchaser, shall be of uniform consistency and free from bubbles, grit, rough particles, floating or caked pigments, and ingredients of respiratory toxicity under normal conditions of use. Component ingredients shall be intimately mixed and processed as required to produce a product which is stable and not subject to abnormal change with age in sealed containers.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of primer shall supply all samples for vendor's tests and shall be responsible for the performance of 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: Composition (3.1), color (3.2.1), density (3.2.2), viscosity (3.2.5), drying time (3.3.1), and water resistance (3.3.2) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of primer to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4, and when purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient primer 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 Drying time test shall be determined on the panels prepared for other tests.

4.3.1.2 A lot shall be all primer made from the same batches of ingredients in a continuous series of operations and presented for vendor's inspection at one time.

4.3.2 For Preproduction Tests: Sample quantity shall be selected at the discretion of the processor, unless otherwise specified.

4.4 Approval:

Vendor shall assign a unique name, alpha numeric identification or other identification traceable to a specific set of ingredients, methods of manufacture and control procedures. If there is any change to ingredients, properties of ingredients, methods of manufacture or control procedures, the identifying name or alpha numeric identification shall also be changed. Production primer shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Panel Preparation: Panels 0.062 x 2 x 4 inches (1.6 x 51 x 102 mm) shall be fabricated from AMS 4037 aluminum alloy and anodized in accordance with AMS 2471. Panels shall be completely coated with primer to the specified thickness.

4.6 Reports:

The vendor of primer shall furnish with each shipment a report showing the results of tests to determine conformance to specified requirements and stating that the primer conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3117, formula number, and quantity.