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400 COMMONWEALTH DRIVE WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 1650A
Superseding AMS 1650

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POLISH, AIRCRAFT METAL

1. SCOPE:

1.1 Form: This specification covers two types of metal polishes in the form of a liquid or a paste.

1.2 Application: Primarily for polishing unpainted aluminum alloy surfaces of aircraft. This polish is not intended for use on plastic or painted surfaces.

1.3 Classification: The metal polishes covered by this specification are classified as follows:

Type I - Liquid
Type II - Paste

1.3.1 Unless a specific type is ordered, either Type I or Type II may be supplied.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) and Aerospace Recommended Practices (ARP) 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
AMS 2825 - Material Safety Data Sheets
AMS 4045 - Aluminum Alloy Sheet and Plate, 5.6Zn - 2.5Mg - 1.6Cu - 0.26Cr (7075; -T6 Sheet, -T651 Plate)
AMS 4049 - Aluminum Alloy Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075; -T6 Sheet, -T651 Plate)

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2.1.2 Aerospace Recommended Practices:

ARP 1512 - Corrosion of Aluminum Alloys by Aircraft Maintenance Chemicals, Sandwich Test

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D56 - Flash Point by Tag Closed Tester
ASTM D562 - Consistency of Paints Using the Stormer Viscometer
ASTM F483 - Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
ASTM F484 - Stress Crazing of Acrylic Plastics in Contact with Liquid or Semi-Liquid Compounds
ASTM F485 - Effects of Cleaners on Unpainted Aircraft Surfaces
ASTM F502 - Determination of Effects of Cleaning and Chemical Maintenance Materials on Painted Aircraft Surfaces

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 Specifications:

MIL-P-25690 - Plastic, Sheets and Parts, Modified Acrylic Base, Monolithic, Crack Propagation Resistant

2.3.2 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Material: The formulation of the polish shall be optional with the manufacturer except as restricted by 3.1.1 and 3.2.

3.1.1 Toxicity: The polish shall not be hazardous as defined by OSHA regulations.

3.2 Properties: The polish shall conform to the following requirements; tests shall be performed in accordance with specified test methods on the product supplied:

3.2.1 Flash Point: Shall be not lower than 60°C (140°F), determined in accordance with ASTM D56.

3.2.2 Viscosity (Type I Only): Shall be 50 - 70 Krebs units, determined in accordance with ASTM D562 at 24°C ± 3 (75°F ± 5).

3.2.3 Corrosion of Metal Surfaces:

3.2.3.1 Sandwich Corrosion: Specimens of AMS 4045 and AMS 4049 aluminum alloy, after test, shall show a rating not worse than 1, determined in accordance with ARP 1512.

3.2.3.2 Total Immersion Corrosion: Polish shall not cause a weight change greater than 0.3 mg/cm^2 per 24 hr for any single panel of AMS 4045 and AMS 4049 aluminum alloy, determined in accordance with ASTM F483. The product shall show no evidence of etching, selective attack, or presence of corrosion products after any time period and only a slight dulling at the end of the test.

3.2.4 Effect on Plastic: Polish shall not craze, stain, or discolor stretched MIL-P-25690 plastic, determined in accordance with ASTM F484.

3.2.5 Effect on Painted Surfaces: Polish shall neither decrease the hardness of the paint film by more than two pencil hardness levels nor shall it produce any staining or blistering of the paint film, determined in accordance with ASTM F502.

3.2.6 Effect on Unpainted Surfaces: Polish, tested in accordance with ASTM F485, shall neither produce streaking nor leave any stains on AMS 4045 and AMS 4049 aluminum alloys which require polishing to remove.

3.2.7 Settling Number (Type I Only): Shall be not greater than 20, determined as in 3.2.7.1.

3.2.7.1 Place 50 mL of well-mixed Type I polish in a 1 x 6 in. (25 x 150 mm) test tube. Cap the tube and allow the tube to remain undisturbed in an upright position for at least 24 hours. After the settling period, invert the test tube repeatedly until the solid matter is dislodged and begins to disperse evenly. Record the number of inversions as the settling number.

3.2.8 Low-Temperature Stability: The polish shall be restorable to its original appearance by vigorous shaking or by stirring after being temperature cycled as in 3.2.8.1.

3.2.8.1 Place approximately 100 mL of Type I polish or 100 g of Type II polish in each of two 125 mL wide-mouth, Pyrex jars and stopper the jars. Set aside one of the jars at 20° - 25°C (70° - 77°F) for the duration of the test period as a control sample. Place the second jar containing the test sample in a cold box maintained at -10°C ± 2 (14°F ± 4) for 2 hr ± 0.1. At the end of the 2-hr period, remove the jar containing the test sample and immerse in a water bath maintained at 47°C ± 1 (117°F ± 2) for 1 hr ± 0.1. Remove the jar from the water bath, dry, and again place in the cold box at -10°C ± 2 (14°F ± 4) for 2 hr ± 0.1. At the end of this second 2-hr period, remove the jar from the cold box and immerse in the water bath maintained at 47°C ± 1 (117°F ± 2) for 1 hr ± 0.1. Remove the jar from the water bath, dry, and again place the jar in the cold box at -10°C ± 2 (14°F ± 4) for a third 2-hr period. At the end of this period, remove the jar from the cold box and allow the jar to remain at room temperature for 16 hr ± 0.5. For Type I polish, shake the jar containing the test sample vigorously by hand; for Type II, stir the contents of the jar. Compare the appearance of the test sample with the control sample.

3.2.9 Abrasive Number: Shall not exceed 5, determined as in 3.2.9.1.

3.2.9.1 Weigh two 0.04 x 3 x 6 in. (1 x 75 x 150 mm) AMS 4049 aluminum alloy panels after washing the panels thoroughly with a non-abrasive detergent, thoroughly rinsing with deionized water, and drying. Cover one of the panels with a thin coating of the polish. Place the second panel on the coated panel and rotate twenty-five times in moderate circular motion. Separate the panels and wipe clean with a soft cloth saturated with acetone. Reweigh and determine the weight loss. Report the weight loss in milligrams as the abrasive number and examine the surfaces of the panels for any evidence of scratching.

3.2.10 Performance: The polish, when used in accordance with manufacturer's ø recommendations, shall restore the reflectivity of unpainted aluminum surfaces of aircraft. Standards for acceptance shall be as agreed upon by purchaser and vendor.

3.3 Quality: The polish, as received by purchaser, shall be uniform in texture, homogeneous, and free from foreign materials detrimental to usage of the polish.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the polish shall supply all ø 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 polish conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for Ø abrasive number (3.2.9) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical Ø requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of polish to a purchaser, when a change in material or 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: Sufficient polish shall be taken at random from each lot to Ø 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 A lot shall be all polish of the same type produced from the same batches of raw materials under the same fixed conditions and presented for vendor's inspection at one time.

4.3.2 When a statistical sampling plan and acceptance quality level (AQL) have Ø been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3 and the report of 4.5 shall state that such plan was used.

4.4 Approval:

4.4.1 Sample polish shall be approved by purchaser before polish for production use is supplied, unless such approval be waived by purchaser. Results of tests on production polish shall be essentially equivalent to those on the approved sample.

4.4.2 Vendor shall use ingredients, manufacturing procedures, and methods of inspection on production polish which are essentially the same as those used on the approved sample polish. If necessary to make any change in ingredients or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material or processing, or both, and, when requested, sample polish. Production polish made by the revised procedure shall not be shipped prior to receipt of reapproval.