

Issued JAN 1978  
Revised MAR 2001  
Reaffirmed JAN 2008

Superseding AMS 1650B

Polish, Aircraft Metal

1. SCOPE:

1.1 Form:

This specification covers a metal polish in the form of a liquid or paste.

1.2 Application:

This product has been used typically for polishing unpainted aluminum alloy surfaces of aircraft, but usage is not limited to such applications, but usage is not limited to such applications. This polish is not intended for use on plastic or painted surfaces.

1.3 Classification:

The metal polish covered by this specification is classified as follows

Type 1 - Liquid

Type 2 - Paste

1.3.1 Unless a specific type is ordered, either Type 1 or Type 2 may be supplied.

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.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2008 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

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

## 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 canceled 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.

- |          |   |
|----------|---|
| 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               |
| AMS 4049 | Aluminum Alloy Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075; -T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated |

### 2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

- |             |   |
|-------------|---|
| ASTM D 56   | Flash Point by Tag Closed Tester  |
| ASTM D 562  | Consistency of Paints Using the Stormer Viscometer                                  |
| ASTM F 483  | Total Immersion Corrosion Test for Aircraft Maintenance Chemicals                   |
| ASTM F 484  | Stress Cracking of Acrylic Plastics in Contact with Liquid or Semi-Liquid Compounds |
| ASTM F 485  | Effects of Cleaners on Unpainted Aircraft Surfaces                                  |
| ASTM F 502  | Effects of Cleaning and Chemical Maintenance Materials on Painted Aircraft Surfaces |
| ASTM F 1110 | Sandwich Corrosion Test   |

### 2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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

## 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 D 56.
- 3.2.2 Viscosity (Type 1 Only): Shall be 50 to 70 Krebs units, determined in accordance with ASTM D 562 at 24 °C ± 3 (75 °F ± 5).
- 3.2.3 Corrosion of Metal Surfaces:
- 3.2.3.1 Sandwich Corrosion: Polish shall produce a rating not worse than 1, determined in accordance with ASTM F 1110.
- 3.2.3.2 Total Immersion Corrosion: Polish shall not cause a weight change greater than 0.3 mg/cm<sup>2</sup> per 24 hours for any panel of AMS 4045 and AMS 4049 aluminum alloy, determined in accordance with ASTM F 483. The product shall cause 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 F 484.
- 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 F 502.
- 3.2.6 Effect on Unpainted Surfaces: Polish, tested in accordance with ASTM F 485, 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 1 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 1 polish in a 1 x 6 inch (25 x 152 mm) test tube. Cap the tube and allow the tube to remain undisturbed in an upright position for not less than 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 1 polish or 100 grams of Type 2 polish in each of two 125 mL wide-mouth Pyrex jars and stopper the jars. Set aside one of the jars at 20 to 25 °C (68 to 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  $-10\text{ °C} \pm 2$  ( $14\text{ °F} \pm 4$ ) for 2 hours  $\pm 0.1$ . At the end of the two hour period, remove the jar containing the test sample and immerse in a water bath maintained at  $47\text{ °C} \pm 1$  ( $117\text{ °F} \pm 2$ ) for 1 hour  $\pm 0.1$ . Remove the jar from the water bath, dry, and again place in the cold box at  $-10\text{ °C} \pm 2$  ( $14\text{ °F} \pm 4$ ) for 2 hours  $\pm 0.1$ . At the end of the second 2-hour period, remove the jar from the cold box and immerse in the water bath maintained at  $47\text{ °C} \pm 1$  ( $117\text{ °F} \pm 2$ ) for 1 hour  $\pm 0.1$ . Remove the jar from the water bath, dry, and again place the jar in the cold box at  $-10\text{ °C} \pm 2$  ( $14\text{ °F} \pm 4$ ) for a third 2-hour 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 hours  $\pm 0.5$ . For Type 1 polish, shake the jar containing the test sample vigorously by hand; for Type 2, 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 inch (1 x 76 x 152 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 recommendations, shall restore the reflectivity of unpainted aluminum surfaces of aircraft.

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 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 polish conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Abrasive number (3.2.9) 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 polish to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

#### 4.3 Sampling and Testing:

Sufficient polish 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 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 has 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 ingredients and/or processing and, when requested, sample polish. Production polish made by the revised procedure shall not be shipped prior to receipt of reapproval.

#### 4.5 Reports:

The vendor of the polish shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the polish conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 1650C, manufacturer's identification, formula number, and quantity.

#### 4.6 Resampling and Retesting:

If any sample used in the above tests fails to meet the specified requirements, disposition of the polish may be based on the results of testing three additional samples for each original nonconforming sample. Failure of any retest sample to meet the specified requirements shall be cause for rejection of the polish represented. Results of all tests shall be reported.