

Remover, Temporary Coating
Alkaline Type, Water Base

1. SCOPE:

1.1 Form:

This specification covers two types of thickened, water base temporary coating remover in the form of an alkaline liquid.

1.2 Application:

This product has been used typically for removing temporary coatings used for protection of aircraft skins from exposure to processing damage, but usage is not limited to such applications.

1.3 Classification:

Remover conforming to this specification is classified as follows:

Type 1 - Ammoniated

Type 2 - Non-Ammoniated

1.3.1 When a type is not specified, Type 1 remover shall 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.

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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.

- AMS 2470 Anodic Treatment of Aluminum Alloys, Chromic Acid Process
- AMS 2475 Protective Treatments, Magnesium Alloys
- AMS 2825 Material Safety Data Sheets
- AMS 4037 Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate), Solution Heat Treated
- AMS 4041 Aluminum Alloy Sheet and Plate, Alclad, 4.4Cu - 1.5Mg - 0.60Mn (Alclad 2024 and 1-1/2% Alclad 2024 -T3 Flat Sheet; 1-1/2% Alclad 2024-T351 Plate)
- 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
- AMS 4377 Sheet and Plate, Magnesium Alloy, 3.0Al - 1.0Zn (AZ31B-H24), Cold Rolled, Partially Annealed
- AMS 4911 Titanium Alloy Sheet, Strip, and Plate, 6Al - 4V, Annealed
- MAM 4911 Titanium Alloy Sheet, Strip, and Plate, 6Al - 4V, Annealed
- AMS 5047 Steel Sheet and Strip, 0.08 - 0.13C, Aluminum Killed, Deep Forming Grade

2.2 ASTM Publications:

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

- ASTM D 1193 Reagent Water
- 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 519 Mechanical Hydrogen Embrittlement Testing of Plating Processes and Aircraft Maintenance Chemicals
- ASTM F 1080 Determining the Consistency of Viscous Liquids Using a Consistometer
- ASTM F 1104 Preparing Aircraft Cleaning Compounds, Liquid Type, Water Base, for Storage Stability Testing
- 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-T-23397 Tape, Pressure-Sensitive Adhesive, for Masking During Paint Stripping Operations
MIL-P-25690 Plastic, Sheets and Parts, Modified Acrylic Base, Monolithic, Crack Propagation Resistant

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Composition of the remover shall be optional with the manufacturer, but shall provide a product meeting the requirements of 3.2.

3.2 Properties:

The product shall conform to the following requirements, tests shall be performed in accordance with specified test methods, on the product supplied, at $24^{\circ}\text{C} \pm 3$ ($75^{\circ}\text{F} \pm 5$) and a relative humidity of $50\% \pm 5$ unless otherwise specified in the applicable test procedure.

3.2.1 Ammonia Content:

3.2.1.1 Type 1: The test strip shall turn red within five seconds, when tested as in 4.5.1.

3.2.1.2 Type 2: The test strip shall show no sign of pink color after 30 seconds, when tested as in 4.5.1.

3.2.2 The product shall be non-toxic, non-corrosive and shall not produce vapors hazardous to personnel when used for its intended purpose in accordance with manufacturer's recommendations.

3.2.3 Consistency: The remover shall flow to a point between 18.0 and 23.0 cm in five minutes, determined in accordance with ASTM F 1080. The remover shall be of such consistency that a smooth, even coating can be applied by brushing, flowing, or spraying onto, and will adhere to, the vertical surface of test panels and surfaces of aircraft for sufficient time for the remover to be effective.

3.2.4 Flammability: Remover shall not continue to burn longer than three seconds after removal of the flame, determined in accordance with 4.5.2.

3.2.5 Effect on Aircraft Surfaces:

3.2.5.1 Sandwich Corrosion: Specimens of AMS 4045 and AMS 4049 aluminum alloy, after testing in accordance with ASTM F 1110, shall not show corrosion worse than that on control panels tested using ASTM D 1193, Type IV, water.

- 3.2.5.2 Total Immersion Corrosion: The product shall neither cause pitting of the panels nor a weight change of any panel greater than shown in Table 1, determined in accordance with ASTM F 483:

TABLE 1 - Maximum Weight Change

Panel	Weight Change mg/cm ² per 24 hours
AMS 4037 Aluminum Alloy, anodized as in AMS 2470	0.3
AMS 4041 Aluminum Alloy	0.3
AMS 4045 Aluminum Alloy, anodized as in AMS 2470	0.3
AMS 4049 Aluminum Alloy	0.3
AMS 4377 Magnesium Alloy, dichromate treated as in AMS 2475	0.2
AMS 4911 or MAM 4911 Titanium Alloy	0.1
AMS 5047 Carbon Steel, polished to a surface finish of 65 microinches (1.7 μm) or better	0.8

- 3.2.5.3 Stress Cracking: There shall be no crazing of MIL-P-25690, Type C, plastic, when tested in accordance with ASTM F 484.
- 3.2.5.4 Hydrogen Embrittlement: The product shall be non-embrittling to ferrous alloys, determined in accordance with ASTM F 519, Type 1a, 1c, or 2a.
- 3.2.6 Storage Stability: Remover shall show no separation after exposure to heat or cold, determined in accordance with ASTM F 1104.
- 3.2.7 Temporary Coating Removal: Remover, tested in accordance with 4.5.3, shall remove at least 90% of the temporary coating from the exposed surface within 30 minutes at 24 °C ± 3 (75 °F ± 5).
- 3.2.8 Rinsability: The loosened coating and spent remover shall be easily removed by water rinsing and remover shall not damage the substrate, determined in accordance with 4.5.4.
- 3.2.9 Volatility: Shall be not greater than the volatility of ASTM D 1193, Type III, water, determined in accordance with 4.5.5.

3.3 Quality:

Remover, as received by purchaser, shall be homogeneous, uniform in consistency, suitable for spraying, brushing, or flowing application, and free from skins, lumps, and from foreign materials detrimental to usage of the remover.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of the product 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 product conforms to the specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Consistency (3.2.3), flammability (3.2.4), temporary coating removal (3.2.7), and rinsability (3.2.8) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction: All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of remover 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:

Shall be in accordance with the following; a lot shall be all remover manufactured at the same time from the same batches of raw materials and presented for vendor's inspection at one time. If remover cannot be identified by batch or tank, a lot shall consist of not more than 5,000 gallons (18,927 L) offered for delivery at one time.

4.3.1 For Acceptance Tests:

4.3.1.1 Bulk Quantity: Samples shall consist of not less than one gallon (3.8 L) of remover from each lot.

4.3.1.2 Filled Containers: A random sample of filled containers shall be selected from each lot to verify conformance to all specified requirements of this specification regarding fill, closure, marking, and other requirements not involving tests.

4.3.1.3 A statistical sampling plan by purchaser and vendor shall be used and the report of 4.6 shall state that such plan was used.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

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

4.4.2 Vendor shall use ingredients, manufacturing procedures, and methods of inspection for production remover which are essentially the same as those used on the approved sample remover. 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, a sample of the revised remover. Production remover made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Tests Methods:

Shall be as follows:

4.5.1 Ammonia Content: Place approximately 8 fluid ounces of remover in a 16 fluid ounce jar. Close the lid tightly and allow the jar to set for at least five minutes at $24\text{ }^{\circ}\text{C} \pm 2$ ($75\text{ }^{\circ}\text{F} \pm 4$). Cut a $1/2 \times 2$ inch (12.7×51 mm) piece of filter paper and wet one end with a 1% solution of phenolphthalein in 95% ethanol. Carefully hold the test strip in the head space of the sample jar, keeping the end of the test strip $1\text{ inch} \pm 0.25$ ($25\text{ mm} \pm 6.4$) above the liquid level for 30 seconds. Do not let the test strip touch the jar or the liquid to prevent a false positive reading.

4.5.2 Flammability:

4.5.2.1 Preparation of Test Panel: One end of a clean AMS 4037 aluminum alloy panel, nominally $0.040 \times 4 \times 3/4$ inch ($1.0 \times 102 \times 19$ mm), anodized in accordance with AMS 2470, shall be held at an angle of approximately 45 degrees. The remover shall be poured along the upper edge of the panel allowing remover to flow freely over the surface. Remover settling on the reverse side of the panel shall be wiped clean before proceeding with the test.

4.5.2.2 Procedure: A micro-burner flame, $1/8$ to $3/16$ inch (3.2 to 4.8 mm) in height shall be passed, within 2 seconds, back and forth along the lower edge of the panel. This operation shall be repeated three times at 3-second intervals. If the remover ignites, the burner flame shall be removed and observation made to ascertain whether the remover continues to burn. The above procedure shall be repeated on another similarly prepared panel except that the panel shall be placed in an oven for 15 minutes ± 1 at $45\text{ }^{\circ}\text{C} \pm 2$ ($113\text{ }^{\circ}\text{F} \pm 4$). The panel shall then be removed from the oven and subjected to the flame test.

4.5.3 Temporary Coating Removal:

4.5.3.1 Preparation of Test Panel: Test panels, nominally $0.020 \times 3 \times 6$ inches ($0.51 \times 76 \times 152$ mm), shall be made from AMS 4041 aluminum alloy. The edges of the panels shall be smooth. Panels double in area may be used by dividing panels into two areas with MIL-T-23397 masking tape. If double size panels are used, the masking tape shall be sufficiently resistant to the remover to remain on the panels during the test. The panels shall be coated with the temporary coating system indicated by purchaser.

- 4.5.3.2 Procedure: Three panels, prepared as in 4.5.3.1, shall be placed on a rack so that the 6-inch (152-mm) dimension forms an approximate 60-degree angle with the horizontal. If double sized panels are used, each side is considered one panel. The test shall be performed in a well ventilated, draft-free room. The current remover in use should also be tested for comparison. The test sample shall be poured along the top edge of each panel, covering only one-half to three-fourths of the test panel, allowing 15 seconds \pm 1 for the wetting procedure for each panel. After 30 minutes \pm 0.2 exposure, the loosened film shall be rinsed, without brushing, under a stream of cool water for five minutes at a flow rate of approximately 4 gallons (15 L) per minute. Exposure time and the percentage of removal of the coating from the exposed surface shall be recorded. Retain panels for rinsability test of 4.5.4.
- 4.5.4 Rinsability: The panels, used in the test of 4.5.3, shall be recoated with remover and placed in a draft-free location for 30 minutes \pm 1. After 30 minutes, any remaining film shall be loosened from the surface. The panels shall be rinsed with tap water for five minutes \pm 0.5 at a flow rate of approximately 4 gallons (15 L) per minute. Rinse off should be from remover treated surface onto untreated surface. The panels shall be examined for removal of the spent remover residues and water break. The panels shall be oven dried for 15 minutes \pm 1 at 70 °C + 5 (158 °F + 9), allowed to cool to room temperature, and visually examined for residue or damage to the substrate. Record results.
- 4.5.5 Volatility: Bring a sample of remover and ASTM D 1193, Type III, water to 24 °C \pm 3 (75 °F \pm 5). A Petri dish, 90 mm in diameter and 15 mm deep, shall be placed on each pan of a two-pan beam balance. Sufficient remover shall be added to cover the entire bottom of one of the dishes. ASTM D 1193, Type III, water shall be carefully poured into the other dish until the dish containing the remover is counter balanced. The balance with the Petri dishes on the pans shall be exposed for 30 minutes \pm 1 in a draft-free location. At the end of the exposure period, the comparative loss in weight shall be determined.
- 4.6 Reports:
- The vendor of remover shall furnish with each shipment a report showing the results of tests on each lot to determine conformance to the acceptance test requirements and stating that the remover conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 1388A, manufacturer's identification, and quantity.
- 4.6.1 A material safety data sheet conforming to AMS 2825, or equivalent, shall be supplied to each purchaser prior to, or concurrent with, the report of preproduction test results or, if preproduction testing be waived by purchaser, concurrent with the first shipment of remover for production use. Each request for modification of remover formulation shall be accompanied by a revised data sheet for the proposed formulation.