SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 1537B

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Superseding AMS 1537A

Cleaner, Alkaline Hot-Tank Type

1. SCOPE:

1.1 Form:

This specification covers an alkaline cleaner in the form of a liquid for use above 65 °C (154 °F).

1.2 Application:

This cleaner has been used typically for removing soils from aluminum and magnesium alloy parts by immersion in hot cleaner solution prior to surface treatment, but usage is not limited to such applications.

1.3 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.

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.

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

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 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 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 4376	Magnesium Alloy Plate, 3.OAl - 1.OZn (AZ31B-H26), Cold Rolled and Partially Annealed

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 1193	Reagent Water
ASTM D 1568	Sampling and Chemical Analysis of Alkylbenzene Sulfonates
ASTM E 70	pH of Aqueous Solutions with the Glass Electrode
ASTM F 483	Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
ASTM F 1104	Preparing Aircraft Cleaning Compounds, Liquid Type, Water Base, for Storage Stability Testing
ASTM F 1110	Sandwich Corrosion Test

3. TECHNICAL REQUIREMENTS:

3.1 Material:

The composition of the cleaner shall be optional with the manufacturer but shall produce a product meeting the requirements of 3.2.

3.2 Properties:

The cleaner shall conform to the following requirements; tests shall be performed in accordance with specified test methods:

3.2.1 Total Immersion Corrosion: The product shall neither cause evidence of corrosion nor a weight change of any test panel greater than that shown in Table 1, determined in accordance with ASTM F 483 at highest concentration and temperature recommended for the cleaner by the manufacturer:

TABLE 1 - Maximum Immersion Weight Change

Test 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 4049 Aluminum Alloy	0.3
AMS 4376 Magnesium Alloy, dichromate treated as in AMS 2475	0.2

3.2.2 Sandwich Corrosion: Cleaner shall produce a rating not worse than 1, determined in accordance with ASTM F 1110.

3.2.3 Solubility: The cleaner shall be readily soluble in water at maximum concentration and minimum temperature specified by manufacturer.

3.2.4 pH Value: Shall be between 9.0 and 11.5 on a 5% by volume solution, determined in accordance with ASTM E 70 at room temperature, making no correction for sodium ion.

3.2.5 Flash Point: Shall be not lower than 70 °C (158 °F), determined in accordance with ASTM D 56 or other method acceptable to purchaser.

3.2.6 Cleaning Performance: The prepared cleaning solution shall remove not less than 70% of the soil on panels prepared and tested in accordance with 3.2.6.1 and 3.2.6.2.

3.2.6.1 Soiling Procedure: Four 2 x 4 inch (51 x 102 mm) AMS 4041 aluminum alloy panels shall be coated with test soil prepared in accordance with Table 2. The soiling mixture shall be well mixed and maintained at 25 °C ± 1 (77 °F ± 2) during the soiling procedure. Immerse four panels in the soiling mixture for 60 seconds, remove panels, and permit excess soiling mixture to drain. Allow to dry at room temperature for 24 hours. Weigh the panels to the nearest 0.1 milligram.

TABLE 2 - Test Soil

Ingredients	Nominal Percent by Weight
Carbon Black	5
Texaco Transultex 240 or equivalent	15
SAE 30 Oil, nondetergent type	5
Solvent	75

3.2.6.2 Soil Removal Test: Prepare a fresh solution of the cleaner at minimum recommended concentration using water conforming to ASTM D 1193. Place 900 mL of the diluted cleaning compound in each of four one liter tall form beakers. Maintain the temperature of the cleaning solution at the minimum recommended temperature. Immerse one each of the soiled panels in each of the beakers containing the cleaning compound by suspending them vertically from a suitable hanger mounted on a laboratory ring stand. Suspend the soiled panel in the center of the beaker so that one end of the panel is one inch (25 mm) from the bottom of the beaker. Place beaker containing the soiled panel on a magnetic stirring apparatus. Place a one inch (25 mm) stirring bar in the beaker. Operate the magnetic stirrer at 300 rpm for 20 minutes. After the 20 minutes cleaning cycle, withdraw the panels from the cleaning solution and immerse them in 900 mL of ASTM D 1193 water contained in a one liter tall form beaker. Repeat the above procedure for the cleaning cycle except operate the magnetic stirrer for two minutes. Remove the panels from the water and dry them in a circulating-air oven maintained at 120 °C ± 1 (248 °F ± 2) for 15 minutes. Remove the panels from the oven and cool them at standard conditions for 15 minutes. Weigh the panels to the nearest 0.1 milligram. The percent soil removal shall be reported as an average value for four panels and calculated using Equation 1.

$$\% \text{ Soil Removed} = \frac{\text{Wgt of soiled panel} - \text{Wgt of cleaned panel}}{\text{Wgt of soiled panel} - \text{Wgt of unsoiled panel}} \times 100 \qquad \text{(Eq. 1)}$$

3.2.7 Storage Stability: The product shall be tested in accordance with ASTM F 1104. The stored cleaning compound shall give a cleaning ability value not less than 90% of that obtained with original compound when tested in accordance with 3.2.6.

3.3 Quality:

The cleaner, as received by purchaser, shall be homogeneous and free from foreign materials detrimental to usage of the cleaner.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of the cleaner 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 cleaner conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: pH value (3.2.4) 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 cleaner 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.