AEROSPACE MATERIAL SPECIFICATION

AMS1527	REV. D

Issued 1977-07
Reaffirmed 2000-06
Revised 2014-01

Superseding AMS1527C

Cleaner for Aircraft Exterior Surfaces
Water-Miscible, Foam-On, Pressure-Spraying

RATIONALE

Changes in this revision include format and editorial changes as well updates to specification revisions.

1. SCOPE

1.1 Form

This specification covers a water-miscible, foam-on, pressure spraying cleaner in the form of a liquid.

1.2 Application

Primarily for removing soils from painted and unpainted aircraft using foam-forming equipment.

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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2470 Anodic Treatment of Aluminum Alloys, Chromic Acid Process

AMS2475 Protective Treatments, Magnesium Alloys

AMS2825 Material Safety Data Sheets

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/AMS1527D

AMS4037 Aluminum Alloy, Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate), Solution Heat Treated

AMS4041 Aluminum Alloy, Alclad Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn, Alclad 2024 and 1-1/2% Alclad 2024, -T3 Flat Sheet; 1-1/2% Alclad 2024-T351 Plate

AMS4049 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

AMS4376 Plate, Magnesium Alloy, 3.0Al - 1.0Zn - 0.20Mn (AZ31B-H26), Cold Rolled and Partially Annealed

AMS4911 Titanium Alloy, Sheet, Strip, and Plate, 6Al - 4V, Annealed

AMS5045 Steel, Sheet and Strip, 0.25 Carbon, Maximum, Hard Temper

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

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 F 483 Total Immersion Corrosion Test for Aircraft Maintenance Chemicals

ASTM F 484 Stress Crazing 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 519 Mechanical Hydrogen Embrittlement Testing of Plating Processes and Aircraft Maintenance Chemicals

ASTM F 1105 Preparing Aircraft Cleaning Compounds, Liquid Type, Solvent Based for Storage Stability Testing

ASTM F 1110 Sandwich Corrosion Test

ASTM F 1111 Corrosion of Low Embrittling Cadmium Plate by Aircraft Maintenance Chemicals

2.3 U. S. Government Publications

Available from DLA Document Services, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6396, http://quicksearch.dla.mil/.

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

MIL-STD-870 Cadmium Plating, Low Embrittlement, Electrodeposition

MIL-STD-2073-1 Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS

3.1 Material

The composition of the cleaner shall be optional with the manufacturer but should contain water, biodegradable surfactants and/or soap builders, emulsifiers, solvents, and foam stabilizers to produce a foamable product completely miscible in water and 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 on the product supplied in concentrated form and at use dilution recommended by the manufacturer; diluent shall be ASTM D 1193, Type IV, water.

3.2.1 Corrosion of Metal Surfaces

3.2.1.1 Sandwich Corrosion

Specimens, after test, shall show a rating not worse than 1, determined in accordance with ASTM F 1110.

3.2.1.2 Total Immersion Corrosion

The product shall neither show evidence of corrosion of the panels nor cause a weight change of any test panel greater than the following, determined in accordance with ASTM F 483:

TABLE 1 - PANEL WEIGHT CHANGE

Panel	Weight Change mg/cm^2 per 24 hours
AMS4037 Aluminum Alloy, anodized as in AMS2470	0.3
AMS4041 Aluminum Alloy (optional)	0.3
AMS4049 Aluminum Alloy	0.3
AMS4376 Magnesium Alloy, dichromate treated as in AMS2475	0.2
AMS4911 Titanium Alloy	0.1
AMS5045 Carbon Steel	0.8

3.2.1.3 Low-Embrittling Cadmium Plate

Panels coated with low-embrittling cadmium plate shall not show a weight change greater than 0.3 mg/cm^2 per 24 hours, determined in accordance with ASTM F 1111.

3.2.2 Hydrogen Embrittlement

The product shall be non-embrittling, determined in accordance with ASTM F 519, utilizing Type 1a, 1c, or 2a specimens, cadmium plated in accordance with MIL-STD-870, Class 1, Type I. Type 1a and Type 1c specimens shall be loaded to 45% of the predetermined notch fracture strength, and Type 2a specimens loaded to 80% of the yield strength. The entire 2a stressed specimen, or just the notched area of the 1a and 1c stressed specimen, shall be immersed continuously in the solution under test for 150 hours at a temperature between 68 to 86 °F (20 to 30 °C).

3.2.3 Flash Point

Shall be not lower than 140 °F (60 °C), determined in accordance with ASTM D 56.

3.2.4 Effect on Plastics

There shall be no crazing or staining of stretched MIL-PRF-25690 plastic, determined in accordance with ASTM F 484.

3.2.5 Effect on Painted Surfaces

The product shall neither decrease the hardness of the paint film by more than two pencil hardness levels nor shall it produce any streaking, discoloration, or blistering of the paint film, determined in accordance with ASTM F 502.

3.2.6 Effect on Unpainted Surfaces

The product, tested in accordance with ASTM F 485, shall neither produce streaking nor leave any stains requiring polishing to remove.

3.2.7 Storage Stability

The product shall neither show separation from exposure to heat or cold nor show an increase in turbidity greater than a control sample equally diluted to use concentration with ASTM D 1193, Type IV, water, determined in accordance with ASTM F 1105.

3.2.8 Foaming Properties

The product shall produce a stable foam and shall exhibit no greater than 80 mls of free liquid after standing 5 minutes, determined in accordance with 3.2.8.1.

3.2.8.1 The compound shall be mixed at the manufacturer's recommended dilution using 10-grain hard water as the diluent (10 grain hard water made up by dissolving 0.20 gram ± 0.005 of analytical reagent calcium acetate ($Ca(C_2H_3O_2)_2 \cdot H_2O$) and 0.14 gram ± 0.005 of analytical reagent magnesium sulfate ($MgSO_4 \cdot 7H_2O$) in one liter of boiling ASTM D 1193, Type IV, water). 100 mls of the dilution shall be placed in a clear glass 500 ml capacity blender. The blender shall be turned on and run for 2 minutes ± 10 seconds at 8000 rpm ± 1000. While blender is running, determine if a stable foam is produced, indicated by little or no movement at the upper surface of the foam. The blender shall be turned off after 2 minutes and the mixture allowed to stand undisturbed for 5 minutes, after which there shall be no greater than 80 mls of free liquid observed in the bottom of the container.

3.2.9 Performance

The product, used in accordance with manufacturer's recommendations, shall remove normally accumulated soils from exterior surfaces of aircraft. Standards for acceptance shall be as agreed upon by purchaser and vendor.

3.3 Quality

The cleaner, as received by purchaser, shall be homogeneous, uniform in color, and free from skins and lumps and 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 specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Effect on plastics (3.2.4), effect on unpainted surfaces (3.2.6), and quality (3.3) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests

Corrosion of metal surfaces (3.2.1), hydrogen embrittlement (3.2.2), flash point (3.2.3), effect on painted surfaces (3.2.5), storage stability (3.2.7), foaming properties (3.2.8), and performance (3.2.9) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.