

Cleaner for Aircraft Exterior Surfaces
Wipe-On, Wipe-Off, Containing Suspended Abrasive Solids

RATIONALE

This specification was revised to meet current verbiage required by SAE standards with no technical changes.

1. SCOPE

1.1 Form

This specification covers a water-soluble cleaner containing suspended abrasive solids in the form of a ready-to-use liquid.

1.2 Application

This cleaner has been used typically for removing resistant soils from exhaust areas of exterior metal and painted surfaces of aircraft by a wipe-on, wipe-off procedure not requiring a water rinsing operation, but usage is not limited to such applications. NOT recommended for use on stretched or cast acrylic plastic.

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.

AMS2475	Protective Treatments, Magnesium Alloys
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

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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 1404	Estimation of Deleterious Particles in Lubricating Grease
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 519	Mechanical Hydrogen Embrittlement Testing of Plating Processes and Aircraft Maintenance Chemicals
ASTM F 1104	Preparing Aircraft Cleaning Compounds, Liquid Type, Water Base, 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 the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, <http://assist.daps.dla.mil/quicksearch/>.

MIL-PRF-23377	Primer Coating, Epoxy Polyamide, Chemical and Solvent Resistant
MIL-PRF-25690	Plastic, Sheets and Parts, Modified Acrylic Base, Monolithic, Crack Propagation Resistant
MIL-PRF-85285	Coating, Polyurethane, Aircraft and Supply Equipment
MIL-STD-870	Cadmium Plating, Low Embrittlement, Electrodeposition

3. TECHNICAL REQUIREMENTS

3.1 Material

Shall consist of a mixture of selected solvents, mild abrasives, detergents, soaps, and water, either with or without thickening agents, to 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 on the product as received in concentrated form:

3.2.1 Corrosion of Metal Surfaces

3.2.1.1 Sandwich Corrosion

Specimens, after test, cleaner shall produce 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 nor cause a weight change of any test panel greater than that shown in Table 1, determined in accordance with ASTM F 483:

TABLE 1 - MAXIMUM IMMERSION WEIGHT CHANGE

Test Panel Material	Weight Change mg/cm ² per 24 hours
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/cm² 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 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

The product shall not craze, stain, or discolor MIL-PRF-25690 stretched acrylic 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 Abrasive Effects

The cleaner shall not scratch glass, paint, or aluminum alloy surfaces, determined in accordance with ASTM D 1404 except that the test specimens shall be glass, AMS4049 aluminum alloy, and AMS4049 aluminum alloy coated with MIL-PRF-23377 epoxy primer and MIL-PRF-85285 polyurethane coating. The cleaner shall be applied to the specimens in the as-received concentrated form. Only arc-type scratches greater than 1/16 inch (1.6 mm) from the edge of any specimen shall be considered.

3.2.8 Storage Stability

The product, tested in accordance with ASTM F 1104, shall be restorable to its original appearance by vigorous shaking and shall conform to all other technical requirements of this specification after the storage stability period.

3.2.9 Performance

The cleaner, when used in accordance with manufacturer's recommendations, shall remove normally accumulated soils from the exterior surfaces of aircraft without leaving any visible residue on any surface tested.

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

Total immersion corrosion (3.2.1.2), effect on painted surfaces (3.2.5), 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

Sandwich corrosion (3.2.1.1), low-embrittling cadmium plate (3.2.1.3), hydrogen embrittlement (3.2.2), flash point (3.2.3), effect on plastics (3.2.4), abrasive effects (3.2.7), storage stability (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.

4.2.3 Preproduction Tests

All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the 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.

4.3 Sampling and Testing

Sufficient cleaner 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. A lot shall be all cleaner produced in a single production run from the same batches of raw materials under the same fixed conditions and presented for vendor's inspection at one time.

4.4 Approval

4.4.1 Sample cleaner shall be approved by purchaser before cleaner for production use is supplied, unless such approval be waived by purchaser. Results of tests on production cleaner 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 cleaner which are essentially the same as those used on the approved sample cleaner. 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 cleaner. Production cleaner made by the revised procedure shall not be shipped prior to receipt of reapproval.