

AEROSPACE MATERIAL SPECIFICATION



AMS 1532C

Issued JAN 1978
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Superseding AMS 1532B

Cleaner for Aircraft Exterior Surfaces Wipe-On, Wipe-Off, Emulsion-Type

1. SCOPE:

1.1 Form:

This specification covers an emulsion-type cleaner in the form of a liquid.

1.2 Application:

This cleaner has been used typically for removing soils from painted and unpainted exterior metal surfaces of aircraft by a wipe-on, wipe-off procedure not requiring a water rinsing operation, 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.

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2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2475	Protective Treatments, Magnesium Alloys
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, 3.0Al - 1.0Zn (AZ31B-H26), Cold Rolled and Partially Annealed
AMS 4911	Titanium Alloy Sheet, Strip, and Plate, 6Al - 4V, Annealed
AMS 5045	Steel Sheet and Strip, 0.25 max Carbon, Hard Temper

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

MIL-C-23377	Primer Coating, Epoxy Polyamide, Chemical and Solvent Resistant
MIL-P-25690	Plastic, Sheets and Parts, Modified Acrylic Base, Monolithic, Crack Propagation Resistant
MIL-C-83286	Coating, Urethane, Aliphatic Isocyanate, for Aerospace Applications

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall consist of a mixture of selected solvents, detergents, soaps, and water, either with or without thickening agents, to produce an emulsion-type 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 and, when specified, 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: 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 cause corrosion nor a weight change of any test panel greater than the amount shown in Table 1, determined in accordance with ASTM F 483:

TABLE 1 - Total Immersion Weight Change

Panel Material	Weight Change mg/cm ² per 24 hours
AMS 4049 Aluminum Alloy	0.3
AMS 4376 Magnesium Alloy, Dichromate Treated as in AMS 2475	0.2
AMS 4911 Titanium Alloy	0.1
AMS 5045 Carbon Steel	0.8

- 3.2.1.3 Low-Embrittling Cadmium Plate: Test 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, Type 1a, 1c, or 2a.
- 3.2.3 Flash Point: Shall be not lower than 60 °C (140 °F), determined in accordance with ASTM D 56.
- 3.2.4 Effect on Plastics: The product, at use dilution recommended by the manufacturer, shall not craze, stain, or discolor MIL-P-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 product shall not scratch glass, paint, or aluminum alloy surfaces, determined in accordance with ASTM D 1404 except that the test specimens shall be glass, AMS 4049 aluminum alloy, and AMS 4049 aluminum alloy coated with MIL-C-23377 epoxy primer and MIL-C-83286 urethane 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 Emulsion Stability: Place 20 mL of undiluted cleaning compound in a 100 mL glass-stoppered graduated cylinder and slowly add 80 mL of ASTM D 1193, Type IV, water. Allow to stand for one minute. Insert stopper and invert the cylinder twice and place on a level surface. A homogeneous emulsion shall be formed. If the water/product emulsion is satisfactory, allow to stand undisturbed for one hour and inspect for separation layer between water phase and solvent phase; if any phase is evident, report this in milliliters. Shake the sample by inverting the cylinder through 20 inversions in less than ten seconds. Allow to remain undisturbed for 48 hours and reinspect for phase separation; report phase separation in milliliters. Any separation beyond five mL is not acceptable.
- 3.2.10 Performance: The product, 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 the requirements of this specification.

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), emulsion stability (3.2.9), and performance (3.2.10) 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 product 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.

4.5 Reports:

The vendor of cleaner shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and, when performed, to the periodic test requirements and stating that the cleaner conforms to the other technical requirements. This report shall include the purchase order number, AMS 1532C, manufacturer's identification, formula number, lot number, and quantity.