

**AEROSPACE
MATERIAL
SPECIFICATION**

Submitted for recognition as an American National Standard

SAE AMS 1535A

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Superseding AMS 1535

CLEANER FOR PLASTIC TRANSPARENCIES

1. SCOPE:

1.1 Form: This specification covers a cleaner for plastic transparencies in the form of a liquid.

1.2 Application: Primarily for removing soils, contaminants, and residues from interior and exterior surfaces of aircraft windows by manual application.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications and Aerospace Recommended Practices shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

AMS 2825 - Material Safety Data Sheets

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)

ANS 4376 - Magnesium Alloy Plate, 3.0Al - 1.0Zn (AZ31B-H26)

2.1.2 Aerospace Recommended Practices:

ARP 1511 - Corrosion of Low-Embrittling Cadmium Plate by Aircraft
Maintenance Chemicals

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2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

- ASTM D56 - Flash Point by Tag Closed Tester
- ASTM D1015 - Freezing Points of High-Purity Hydrocarbons
- ASTM D1193 - Reagent Water
- ASTM D1568 - Sampling and Chemical Analysis of Alkylbenzene Sulfonates
- ASTM F483 - Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
- ASTM F484 - Stress Cracking of Acrylic Plastics in Contact with Liquid and Semi-Liquid Compounds
- ASTM F485 - Effects of Cleaners on Unpainted Aircraft Surfaces
- ASTM F502 - Effects of Cleaning and Chemical Maintenance Materials on Painted Aircraft Surfaces
- ASTM F503 - Preparing Aircraft Cleaning Compounds, Liquid Type, for Storage Stability Testing
- ASTM F519 - Mechanical Hydrogen Embrittlement Testing of Plating Processes and Aircraft Maintenance Chemicals

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Specifications:

P-P-560 - Polish, Plastic

2.3.2 Military Specifications:

MIL-P-83310 - Plastic Sheet, Polycarbonate, Transparent

2.3.3 Military Standards:

MIL-STD-794 - 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 shall contain ingredients producing antistatic properties as specified in P-P-560 and meeting the requirements of 3.2.

3.2 Properties: Cleaner shall conform to the following requirements; tests shall be performed in accordance with specified test methods on the product supplied, both in concentrated form and at use dilution recommended by the manufacturer:

3.2.1 Corrosion of Metal Surfaces:

- 3.2.1.1 Total Immersion Corrosion: The cleaner 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 F483:

Test Panel	Weight Change mg/cm ² per 24 hr
AMS 4041 Aluminum Alloy	0.3
AMS 4049 Aluminum Alloy	0.4
AMS 4376 Magnesium Alloy	0.8

- 3.2.1.2 Low-Embrittling Cadmium Plate: Test panels coated with low-embrittling cadmium plate shall not show a weight change greater than 1.0 mg/cm² per 24 hr, determined in accordance with ARP 1511.
- 3.2.2 Effect on Transparent Plastics: The cleaner shall not craze, stain, or discolor Type A, B, or C acrylic plastics when tested in accordance with ASTM F484. The cleaner shall not craze, stain, or discolor MIL-P-83310 polycarbonate plastic or polysulfone plastic, determined in accordance with test procedures specified in ASTM F484 on specimens stressed to an outer fiber stress of 3000 psi (20 MPa) for 30 min. \pm 2.
- 3.2.3 Effect on Painted Surfaces: The cleaner shall neither decrease the hardness of polyurethane or other paint films specified by purchaser 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 F502.
- 3.2.4 Effect on Unpainted Surfaces: The cleaner, tested in accordance with ASTM F485, shall neither produce streaking nor leave any stains requiring polishing to remove.
- 3.2.5 Hydrogen Embrittlement: The product shall be non-embrittling, determined in accordance with ASTM F519, Types 1a, 1c, or 2a.
- 3.2.6 Flash Point: Shall be not lower than 70°C (160°F), determined in accordance with ASTM D56.
- 3.2.7 Freeze Point: Shall be determined in accordance with ASTM D1015 and the results reported.
- 3.2.8 Storage Stability: The cleaner 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 D1193, Type IV, water, determined in accordance with ASTM F503.
- 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 performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. 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: Tests to determine conformance to requirements for effect on transparent plastics (3.2.2) and effect on unpainted surfaces (3.2.4) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for corrosion of metal surfaces (3.2.1), effect on painted surfaces (3.2.3), hydrogen embrittlement (3.2.5), flash point (3.2.6), freeze point (3.2.7), and storage stability (3.2.8) are classified as 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: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of cleaner to a purchaser, when a change in material, processing, or both, requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.3.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be in accordance with all applicable requirements of ASTM D1568; a lot shall be all cleaner produced in one continuous manufacturing operation from the same lots of raw materials and presented for vendor's inspection at one time.

4.3.1 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3 and the report of 4.5 shall state that such plan was used.

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.