

AEROSPACE MATERIAL SPECIFICATION



AMS 1640B

Issued JAN 1979
Revised JUL 1988
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Superseding AMS 1640A

Corrosion Removing Compound For Aircraft Surfaces

1. SCOPE:

1.1 Form:

This specification covers a corrosion-removing compound in the form of a liquid concentrate.

1.2 Application:

Primarily for removing pitting corrosion and heavy surface oxidation from exterior aluminum surfaces of aircraft.

1.3 Precautions:

Compounds meeting the requirements of this specification may cause hydrogen embrittlement of high-strength steels and will remove cadmium plate.

1.4 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 following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications 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.

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2.1.1 Aerospace Material Specifications:

AMS 2350	Standards and Test Methods
AMS 2825	Material Safety Data Sheets
AMS 4049	Aluminum Alloy Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075; -T6 Sheet, -T651 Plate)

2.2 ASTM Publications:

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

ASTM D92	Flash and Fire Points by Cleveland Open Cup
ASTM D1193	Reagent Water
ASTM D1568	Sampling and Chemical Analysis of Alkylbenzene Sulfonates
ASTM D2196	Viscosity Measurements and Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield) Viscometer
ASTM F483	Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
ASTM F484	Stress Cracking of Acrylic Plastics in Contact with Liquid or Semi-Liquid Compounds
ASTM F502	Effects of Cleaning and Chemical Maintenance Materials on Plated Aircraft Surfaces
ASTM F503	Preparing Aircraft Cleaning Compounds, Liquid Type, for Storage Stability Testing

2.3 U. S. Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-P-25690	Plastic, Sheets and Parts, Modified Acrylic Base, Monolithic, Crack Propagation Resistant
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2.3.2 Military Standards:

MIL-STD-794	Parts and Equipment, Procedures for Packaging and Packing of
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3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall be a viscous, thixotropic, concentrated compound which will readily mix with water to form a homogeneous solution. Compound, diluted with ASTM D1193, Type IV, water, to use concentration in accordance with manufacturer's recommendations, shall retain its thixotropic properties, shall be suitable for application by wiping, rinsing, or spraying, and shall be readily removable by wiping or rinsing procedures.

3.1.1 There shall be no violent or dangerous reactions when the concentrate is diluted for use in accordance with manufacturer's recommendations.

3.2 Properties:

Compound 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 as hereinafter specified.

3.2.1 Concentrated Compound:

3.2.1.1 Flash Point: Shall be not lower than 65 °C (150 °F), determined in accordance with ASTM D92.

3.2.1.2 Solubility: Compound shall be completely soluble in water to make a uniform solution free from gelatinous lumps, layering of ingredients, and sediment.

3.2.1.3 Stability: Compound shall remain homogeneous and free from sedimentation and layering of ingredients, determined in accordance with ASTM F503. Compound, stored in shipping container or use package, shall meet all other technical requirements of this specification at any time up to one year from date of receipt by purchaser.

3.2.2 Concentrated Compound and at Use Dilution:

3.2.2.1 Viscosity: Shall be not lower than the following, determined in accordance with ASTM D2196 at 20 °C ± 2 (68 °F ± 4) using a No. 1 spindle at 6 RPM:

Concentrated Compound	550 cP (mPa·s)
50% Solution of Concentrate in ASTM D1193, Type IV, Water	55 cP (mPa·s)

3.2.2.2 Immersion Corrosion: Compound shall neither show evidence of staining, pitting, or corrosion nor cause an average weight change of AMS 4049 aluminum alloy panels greater than 2.5 mg/sq in. per 30 min. (0.4 mg/cm² per 30 min), determined in accordance with ASTM F483 under the test conditions given in 3.2.2.2.1.

3.2.2.2.1 The weighed panels shall be totally immersed in 100 mL of compound, immediately removed, and suspended vertically for 30 min. ± 1 at 25 °C ± 2 (77 °F ± 4).

3.2.2.3 Effect on Transparent Plastics: Compound shall not craze, stain, or discolor MIL-P-25690 stretched acrylic plastic, determined in accordance with ASTM F484.

3.2.2.4 Effect on Painted Surfaces: Compound shall neither decrease the hardness of the paint film by more than one pencil hardness level nor shall it produce any streaking, discoloration, or blistering of the paint film, determined in accordance with ASTM F502.

3.3 Quality:

Compound, as received by purchaser, shall be a homogeneous liquid free from sediment, abrasives, skins, lumps, and other impurities detrimental to usage of the compound.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

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

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for viscosity (3.2.2.1) and immersion corrosion (3.2.2.2) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for flash point (3.2.1.1), solubility (3.2.1.2), effect on transparent plastics (3.2.2.3), and effect on painted surfaces (3.2.2.4) are classified as periodic tests and shall be performed at a frequency selected by the manufacturer 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 compound 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, contracting officer, or request for procurement.

4.3 Sampling:

Shall be in accordance with all applicable requirements of ASTM D1658; a lot shall be all compound 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 compound shall be approved by purchaser before compound for production use is supplied, unless such approval be waived by purchaser. Results of tests on production compound 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 compound which are essentially the same as those used on the approved sample compound. If necessary to make any change in ingredients or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material, processing, or both and, when requested, sample compound. Production compound made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

Unless waived by purchaser, the vendor of the compound 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 compound conforms to the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 1640A, manufacturer's identification, and quantity.

- 4.5.1 A material safety data sheet conforming to AMS 2825, or equivalent, shall be supplied to each purchaser prior to, or concurrent with, the report of preproduction test results or, if preproduction testing be waived by purchaser, concurrent with the first shipment of compound for production use. Each request for modification of compound formulation shall be accompanied by a revised data sheet for the proposed formulation.
- 4.5.2 A bulletin describing the compound and method of use shall be provided by the compound manufacturer. This bulletin shall provide the purchaser with detailed instructions for use of the compound. The bulletin shall also include mixing instructions, material compatibility, properties, control analysis procedures, and safety practices including precautions pertaining to hazardous ingredients, and recommended dilution for use.

4.6 Resampling and Retesting:

If any sample used in the above tests fails to meet the specified requirements, disposition of the compound may be based on the results of testing three additional samples for each original nonconforming sample. Failure of any retest sample to meet the specified requirements shall be cause for rejection of the compound represented and no additional testing shall be permitted. Results of all tests shall be reported.