



AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AMS 1640

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Revised

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.

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

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

AMS 4049 - Aluminum Alloy Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.26Cr
(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 F484 - Stress Cracking of Acrylic Plastics in Contact with Liquid or Semi-Liquid Compounds

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

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120 except as specified in 2.3.4.

2.3.1 Federal Specifications:

QQ-A-250/13 - Aluminum Alloy Alclad 7075 Plate and Sheet

2.3.2 Military Specifications:

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

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade or their use by governmental agencies is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

2.3.3 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

2.3.4 U. S. Department of Labor, Occupational Safety and Health Administration Forms: Available from regional offices of U. S. Department of Labor, Bureau of Labor Standards.

OSHA Form 20 - Material Safety Data Sheet

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be a viscous, thixotropic, acid-base, concentrated compound which will readily mix with water to form a homogeneous solution. Compound, diluted for use 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 shall meet all other technical requirements of this specification at any time up to one year of storage in shipping container or use package.

3.2.2 Concentrated Compound and at Use Dilution:

3.2.2.1 Viscosity: Shall be not lower than the following, determined at 20° C + 2 (68° F + 4) on a Brookfield Viscometer, Model LV, using a No. 1 spindle at 6 RPM or equivalent equipment:

Concentrated Compound	550 cp
50% Solution of Concentrate in Distilled Water	55 cp

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 or QQ-A-250/13 aluminum alloy panels greater than 2.5 (mg/sq in.) /30 min. (0.4 (mg/cm²/30 min.) determined in accordance with 3.2.2.2.1.

- 3.2.2.2.1 Three AMS 4049 or QQ-A-250/13 alclad aluminum alloy panels, 0.050 x 1 x 2 in. (12.1 x 25 x 50 mm), shall be thoroughly cleaned with methyl ethyl ketone or acetone, allowed to dry, and weighed to the nearest 0.1 milligram. The weighed panels shall be totally immersed in 100 mL of compound, immediately removed, and suspended vertically for 30 min. ± 1 at $25^{\circ}\text{C} \pm 2$ ($77^{\circ}\text{F} \pm 4$). After the 30 min., the panels shall be thoroughly rinsed with deionized or distilled water, rinsed in acetone, and allowed to dry. The panels shall be reweighed and the average weight loss of the three panels determined. The panels shall also be visually inspected for evidence of staining, pitting, or corrosion.
- 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: Corrosion removing 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 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 perform such confirmatory testing as he deems 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 conducted 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 conducted on the compound 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 conducted on the initial shipment of compound to a purchaser, when a change in material or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing of the compound 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: Sufficient compound shall be taken at random from each lot to perform all required tests. The number of tests 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 compound produced in one continuous manufacturing operation from the same lots of raw materials and presented for vendor's inspection at one time.

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. 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, the vendor shall submit for reapproval a statement of the proposed changes in material or processing 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 three copies of a report showing the results of tests to determine conformance to the acceptance 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, material specification number, manufacturer's identification, and quantity.
- 4.5.1 Reports of preproduction test results shall include an executed copy of OSHA Form 20 Material Safety Data Sheet, or equivalent, covering product formulation. All requests for modification of formulation shall be accompanied by a similar form 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.
- 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.
5. PREPARATION FOR DELIVERY:
- 5.1 Identification: Each container shall be legibly marked to show not less than AMS 1640, purchase order number, manufacturer's identification, lot number, and quantity.
- 5.2 Packaging:
- 5.2.1 Compound shall be packaged in suitable containers of a type and size agreed upon by purchaser and vendor.
- 5.2.2 Containers of compound shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the compound to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.
- 5.2.3 For direct U.S. Military procurement packaging shall be in accordance with MIL-STD-794, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.2.1 and 5.2.2 will be acceptable if it meets the requirements of Level C.
6. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
7. REJECTIONS: Compound not conforming to this specification or to authorized modifications will be subject to rejection.