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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 1538A

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Superseding AMS 1538

Deoxidizer, Acidic, for Magnesium Alloys

1. SCOPE:

1.1 Form:

This specification covers an acidic deoxidizer in the form of a liquid.

1.2 Application:

This product has been used typically for removing oxides and corrosion from magnesium alloys, 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 following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

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

AMS 2825 Material Safety Data Sheets
AMS 4377 Magnesium Alloy Sheet and Plate, 3.0Al - 1.0Zn (AZ31B - H24), Cold Rolled, Partially Annealed

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.2 U. S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-P-25690	Plastic, Sheets and Parts, Modified Acrylic Base, Monolithic, Crack Propagation Resistant
MIL-STD-2073-1	DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall be optional with the manufacturer but shall yield a product conforming to the requirements of 3.2.

3.2 Properties:

Deoxidizer shall conform to the following requirements; tests shall be conducted in accordance with specified test methods on the product at the lowest use dilution recommended by the manufacturer:

3.2.1 Oxide Removing Ability: The deoxidizer shall remove oxide from magnesium alloy surfaces as well as, or better than, the control formula of 3.2.1.1.1, determined in accordance with 3.2.1.1.

3.2.1.1 Clean six AMS 4377 magnesium alloy specimens of convenient size by wiping with a clean cloth wet with methyl ethyl ketone or other suitable solvent. Immediately immerse three of the six specimens in the deoxidizer solution maintained at the midpoint of the manufacturer's recommended operating temperature range. When manufacturer makes no recommendation on temperature, the deoxidizer solution shall be maintained at 90 °C ± 3 (194 °F ± 5). Immerse the other three remaining specimens in the control solution of 3.2.1.1.1. The test solution and the control solution shall not be agitated during the immersion period. After 60 seconds ± 15, remove the specimens from the solutions. Flush surfaces of the specimens with flowing tap water followed by rinsing with flowing distilled or deionized water. Allow specimens to air dry. Visually compare the degree of oxide removal from the specimens immersed in the deoxidizer solution with the specimens immersed in the control solution.

3.2.1.1.1 Deoxidizer Control Solution: Shall be a solution containing 165 - 195 grams chromium trioxide ($Cr0_3$) per liter of solution dissolved in distilled or deionized water and operated at 90 °C ± 3 (194 °F ± 5).

3.2.2 Etch Rate on Magnesium Alloy: The deoxidizer, tested in accordance with 3.2.2.1, shall not remove more than 10 milligrams from any single test specimen.

3.2.2.1 Clean three AMS 4377 magnesium alloy specimens, approximately 0.040 x 1 x 2 inches (1.02 x 25 x 51 mm), by wiping with a clean cloth wet with methyl ethyl ketone or other suitable solvent. Allow specimens to air dry. Weigh each specimen to the nearest 0.1 milligram. Immerse specimens for 30 minutes ± 0.25 in 500 milliliters of deoxidizer solution maintained at the highest temperature of the manufacturer's recommended operating range. When manufacturer makes no recommendation on temperature, the deoxidizer solution shall be maintained at 90 °C ± 3 (194 °F ± 5). Test solution shall not be agitated during the immersion period. Remove specimens and immediately flush residual deoxidizer solution from the specimen surfaces with flowing tap water, followed by rinsing with flowing deionized or distilled water. Allow to air dry. Reweigh specimens and calculate weight loss of each specimen.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of the deoxidizer shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the deoxidizer conforms to the requirements of this specification.

4.2 Classification of Tests:

Tests for all technical requirements are acceptance tests and preproduction tests and shall be performed prior to or on the initial shipment of deoxidizer to a purchaser, on each lot, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.1 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 and Testing:

Sufficient deoxidizer 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 deoxidizer manufactured at one time from one group of raw materials and presented for vendor's inspection at one time.

4.4 Approval:

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

4.5 Reports:

The vendor of deoxidizer shall furnish with each shipment a report showing the results of tests to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 1538A, 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 deoxidizer for production use. Each request for modification of deoxidizer formulation shall be accompanied by a revised data sheet for the proposed formulation.

4.6 Resampling and Retesting:

If any sample used in the above tests fails to meet the specified requirements, disposition of the deoxidizer 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 deoxidizer represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Deoxidizer shall be packaged in containers of a type and size acceptable to purchaser.

5.1.2 Each container of deoxidizer shall be legibly marked with not less than AMS 1538A, purchase order number, manufacturer's identification, lot number, and quantity.

5.1.3 Containers of deoxidizer 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 deoxidizer to ensure carrier acceptance and safe delivery.

5.1.4 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-2073-1, Commercial Level, unless Level A is specified in the request for procurement.