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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 1547

Issued APR 1987
Reaffirmed SEP 1996

Cleaner, Anodic, Electrolytic, Alkaline For Steel, Tank Type

1. SCOPE:

1.1 Form:

This specification covers an electrolytic alkaline cleaner in the form of a water soluble powder.

1.2 Application:

Primarily for removing grease, oil, and loose surface contamination from steel components by immersion in a solution of the cleaner at elevated temperature and with anodically applied current. This cleaner should not be used on titanium components.

1.3 Precautions:

Cleaner may contain chemicals which, if improperly used, could be hazardous to the health and safety of operators. Protective clothing, including eye shields, suitable gloves, and apron, should be worn when preparing and using the cleaner. Solutions shall be prepared and operated under conditions of adequate fume extraction and with due regard to the safety recommendations of the manufacturer of the cleaner together with local workshop safety regulations.

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.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7121 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 SAE Publications:

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

AMS 2350 Standards and Test Methods
AMS 2825 Material Safety Data Sheets
AMS 5044 Steel Sheet and Strip, O.15 max Carbon, Half Hard Temper

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 1193 Reagent Water
ASTM D 1568 Sampling and Chemical Analysis of Alkylbenzene Sulfonates
ASTM D 2667 Biodegradability of Alkylbenzene Sulfonates

2.3 U.S. Government Publications:

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

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Cleaner shall contain not less than 30% by weight sodium hydroxide but otherwise composition shall be optional with the manufacturer. When prepared in accordance with manufacturer's instructions, powder shall form a single phase liquid with no solid sediment at room temperature and shall meet the requirements of 3.2. Solution makeup and control shall be in accordance with manufacturer's instructions and purchaser's requirements.

3.2 Properties:

Cleaner shall conform to the following requirements; tests shall be performed in accordance with specified test methods on the cleaner supplied at the maximum concentration and temperature recommended by the manufacturer.

3.2.1 Immersion Corrosion: A test panel of AMS 5044 steel shall not exhibit a loss in weight greater than 0.02 mg/cm^2, determined in accordance with 4.5.1.

3.2.2 Biodegradability: Vendor shall supply evidence that surfactants used in the cleaner shall be at least 90% biodegradable, determined either in accordance with ASTM D 2667 or by alternate methods agreed upon by purchaser and vendor.

3.2.2.1 Evidence of surfactant biodegradability does not guarantee that the cleaner may be discharged in either concentrated or diluted form into public waterways or sewage systems. Disposal shall conform to international, federal, state, or local regulations as applicable.

3.2.3 Storage Stability: Cleaner stored at 25 °C ± 5 (77 °F ± 10) for one year shall show no visual evidence of deterioration and shall meet all other technical requirements of this specification.

3.2.4 Performance: Cleaner, used in accordance with manufacturer's recommendations, shall remove grease, oil, and loose surface contamination from steel components.

3.4 Quality:

Cleaner, as received by purchaser, shall be free from lumping caused by moisture absorption and free from foreign material 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 4.6. 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:

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.

4.2.1 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 ASTM D 1568. 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. An inspection lot shall not exceed 10,000 lb (4500 kg) and may be packaged and delivered in smaller quantities under the basic lot approval provided lot identification is maintained.

4.4 Approval:

4.4.1 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.

4.4.1.1 A new or revised cleaner may be conditionally approved pending completion of the storage stability test of 3.2.3. Full approval will be granted after completion of storage stability testing.

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 material, processing, or both and, when requested, sample cleaner. Production cleaner made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Immersion Corrosion Test:

4.5.1.1 Test Panel Preparation:

4.5.1.1.1 Prepare a 2 x 3 x 0.04 in (50 x 75 mm x 1 mm) panel from AMS 5044 steel and deburr all edges.

4.5.1.1.2 Immerse the panel in a beaker of 1,1,1-trichloroethane maintained at 65 °C ± 3 (150 °F ± 5), and swab the surface of the specimen thoroughly, using clean forceps to hold the specimen and the cotton swab.

4.5.1.1.3 Shake off excess solvent. Immerse the specimen several times in a beaker of acetone.

4.5.1.1.4 Shake off excess acetone and dry in a vacuum desiccator or in an oven at 35 °C ± 3 (100 °F ± 5) for not less than 15 minutes.

4.5.1.1.5 Weigh the test specimen to the nearest 0.1 milligram (W1).

4.5.1.2 Procedure:

4.5.1.2.1 Make up 750 mL ± 10 of a solution of cleaner in a 1-L corrosion resistant steel beaker. The solution concentration shall be the highest recommended by the manufacturer. ASTM D 1193, Type IV, reagent water shall be used to prepare the solution.

4.5.1.2.2 Maintain the temperature of the solution at the maximum recommended by the manufacturer for the duration of the test.

4.5.1.2.3 Suspend the specimen in the center of the beaker so that it is completely immersed and cannot come into contact with the beaker during the test.

4.5.1.2.4 Connect the beaker and specimen in a direct current electrical circuit as shown in Figure 1 using rheostat R to stop the flow of current.

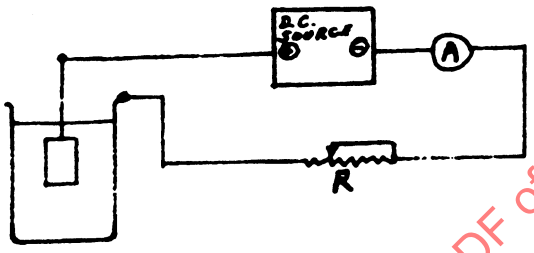

FIGURE 1

4.5.1.2.5 Using rheostat R, increase the current registered by ammeter A to 6.25 A ± 0.25. Allow current to flow for not less than 15 minutes.

4.5.1.2.6 After 15 min ± 0.2 shut off the current and remove the test specimen from the circuit. Wash the specimen in cold ASTM D 1193, Type IV, water followed by rinsing in acetone.

4.5.1.2.7 Dry and weigh the specimen as detailed in 4.5.1.1.4 and 4.5.1.1.5 (W_2).

4.5.1.2.8 Calculate weight variance from the equation:

$$\frac{W_1 - W_2}{\text{Panel Area in cm}^2} \qquad \text{(Eq. 1)}$$

4.6 Reports:

4.6.1 Unless waived by purchaser, the vendor of cleaner shall furnish with the initial shipment a report showing the results of tests to determine conformance to the technical requirements of this specification except that for a new or revised compound, the results of the storage stability test may be omitted. This report shall include the purchase order number, lot number, AMS 1547, manufacturer's identification, and quantity.

4.6.1.1 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 cleaner for production use. Each request for modification of cleaner formulation shall be accompanied by a revised data sheet for the proposed formulation.