

ACID, INHIBITED PHOSPHORIC
Aircraft Turbine Engine Components
Room Temperature Application

1. SCOPE:

1.1 Form: This specification covers an inhibited phosphoric acid in the form of a liquid concentrate or a water soluble powder for dilution with water.

1.2 Application: Primarily for derusting of aircraft turbine engine ferrous components and removal of heat scale and other contamination from the surface of nickel alloys by immersion at room temperature. Should not be used on steel parts having hardness of 40 HRC or over.

1.3 Precautions: Inhibited acid 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 acid. Tanks shall be prepared and operated under conditions of adequate fume extraction and with due regard to the safety recommendations of the manufacturer of the acid mixture together with local workshop safety regulations.

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

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2.1.2 Aerospace Recommended Practices:

ARP 1755 - Effect of Cleaning Agents on Aircraft Engine Materials, Stock Loss Test Method

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

ASTM D1568 - Sampling and Chemical Analysis of Alkylbenzene Sulfonates
ASTM D2667 - Biodegradability of Alkylbenzene Sulfonates

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 Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall be optional with the manufacturer but when prepared in accordance with manufacturer's instructions shall form a liquid product, with no solid sediment at room temperature, meeting the requirements of 3.2. Solution make up and control shall be in accordance with manufacturer's instructions and purchaser's requirements.

3.2 Properties: The product shall conform to the following requirements; tests shall be performed in accordance with specified test methods on the product supplied at the maximum concentration and temperature recommended by the manufacturer.

3.2.1 Stock Loss: Test panels of alloys or electrodeposits shall not incur stock loss exceeding 0.000025 in. (0.625 μm) per surface and plasma deposited coatings shall not incur stock loss exceeding 0.0001 in. (2.5 μm) when tested in accordance with ARP 1755, Category 1. Where required in ARP 1755, stock loss figures shall be reported. Vendor may indicate where the product is not recommended for particular alloys or surface coatings.

3.2.2 Pitting and Intergranular Attack: Test panels and bars used for the stock loss test of 3.2.1 shall neither exhibit pitting corrosion nor show visual evidence of degradation, when examined at 50X magnification under good oblique surface lighting conditions.

3.2.3 Biodegradability: Vendor shall supply evidence that surfactants used in the product shall be at least 90% biodegradable, determined either in accordance with ASTM D2667 where relevant to surfactant type or by alternative methods appropriate to surfactant type as agreed upon by purchaser and vendor.

- 3.2.3.1 Evidence of surfacant biodegradability does not guarantee that the acid may be discharged in either concentrated or diluted form into public waterways or sewerage systems; manufacturers shall give advice on the means for disposal.
- 3.2.4 Storage Stability: Acid stored at $25^{\circ}\text{C} \pm 5$ ($77^{\circ}\text{F} \pm 9$) for one year shall show no visual evidence of deterioration and shall meet all other technical requirements of this specification.
- 3.2.5 Performance: Acid, prepared and used in accordance with the manufacturer's instructions shall, at room temperature, remove rust from ferrous parts and remove heat scale from nickel alloys. Acid which meets all other technical requirements of this specification shall be tested for cleaning performance in an approved engine overhaul facility for not less than six months, during which time at least ten turbofan or turbojet engines, or equivalent, shall be processed with satisfactory results before approval for service use is granted by the applicable engine manufacturer.
- 3.3 Quality: Acid, as received by purchaser, if a liquid, shall be clear, homogeneous, and free from solid particles and separation and from foreign materials detrimental to usage of the acid and if a powder form, shall be free flowing, free from lumping caused by moisture absorption, and free from foreign material detrimental to its usage.

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of the product 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 product 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 acid 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 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 D1568, unless otherwise specified by purchaser. A lot shall be all product 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 6,000 gal (22,500 L) if a liquid or 10,000 lb (4500 kg) if a powder. The product may be packaged in smaller quantities under the basic lot approval provided lot identification is maintained.

4.4 Approval:

4.4.1 Acid shall be approved by purchaser before acid for production use is supplied, unless such approval be waived by purchaser. Results of tests on production acid shall be essentially equivalent to those on the approved sample acid.

4.4.1.1 A new or revised product may be conditionally approved pending completion of the storage stability test of 3.2.4. Full approval will be granted following testing for the other technical requirements after completion of storage stability testing.

4.4.2 Vendor shall use ingredients, manufacturing procedures, and methods of inspection on production acid which are essentially the same as those used on the approved sample acid. 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 acid. Production acid made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

4.5.1 Unless waived by purchaser, the vendor of the product 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 product, the results of the storage stability test may be omitted. This report shall include the purchase order number, lot number, AMS 1384, manufacturer's identification, and quantity.

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