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AEROSPACE MATERIAL SPECIFICATION

AMS 1380

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Revised

SCALE CONDITIONER, ALKALINE
Aircraft Turbine Engine Components

1. SCOPE:

1.1 Form: This specification covers a strongly alkaline scale conditioner in the form of a liquid or a water-soluble powder.

1.2 Application: Primarily for conditioning heat scale formed on aircraft turbine engine high-temperature alloys by immersion in a solution of the cleaner at elevated temperature. These cleaners are unsuitable for aluminum alloys.

1.3 Classification: Compounds conforming to this specification are classified as follows:

Type I - Water-soluble powder
Type II - Liquid concentrate

1.3.1 Type I shall be supplied unless Type II is ordered.

1.4 Precautions: Conditioner 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 conditioner. 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 conditioner 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

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 strongly alkaline 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: Conditioner 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 3. Where required in ARP 1755, stock loss figures shall be reported. Vendor may indicate where conditioner 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 conditioner 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 conditioner 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: Conditioner stored at 25°C ± 5 (77°F ± 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: Conditioner, prepared and used in accordance with manufacturer's instructions, shall condition heat scale on parts to make scale readily removable. Conditioner which meets all other technical requirements of this specification shall be tested for conditioning 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: The conditioner, as received by purchaser, if a liquid, shall be clear, homogenous, and free from solid particles and separation and from foreign materials detrimental to usage of the conditioner and if a powder form, shall be free flowing, free from lumping caused by moisture absorption, and from foreign materials detrimental to its usage.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the conditioner 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 conditioner 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 conditioner 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 conditioner 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 conditioner may be packaged in smaller quantities under the basic lot approval provided lot identification is maintained.

4.4 Approval:

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

4.4.1.1 A new or revised conditioner 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 conditioner which are essentially the same as those used on the approved sample conditioner. 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 conditioner. Production conditioner 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 conditioner 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 conditioner, the results of the storage stability test may be omitted. This report shall include the purchase order number, lot number, AMS 1380, 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 conditioner for production use. Each request for modification of formulation shall be accompanied by a revised data sheet for the proposed formulation.