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AEROSPACE MATERIAL SPECIFICATION

AMS 1546

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Revised

COMPOUND, CARBON REMOVING, ORTHODICHLOROBENZENE for Engine Parts

1. SCOPE:

1.1 Form: This specification covers a compound based on orthodichlorobenzene in the form of a liquid.

1.2 Application: Primarily for use, after being heated, in engine overhaul cleaning systems for the removal of carbon. This cleaning compound is not suitable for parts fabricated from titanium or assemblies which incorporate titanium parts.

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

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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 D93 - Flash Point by Pensky-Martens Closed Tester
ASTM D96 - Water and Sediment in Crude Oils
ASTM D453 - Tar Acids in Creosote-Coal Tar Solutions
ASTM D460 - Sampling and Chemical Analysis of Soaps and Soap Products
ASTM D847 - Acidity of Benzene, Toluene, Xylenes, Solvent Naphthas, and Similar Industrial Aromatic Hydrocarbons
ASTM D891 - Specific Gravity of Industrial Aromatic Hydrocarbons and Related Materials
ASTM D1078 - Distillation Range of Volatile Organic Liquids
ASTM D1240 - Rosin Acids in Fatty Acids
ASTM D1959 - Iodine Value in Drying Oils and Fatty Acids
ASTM D1962 - Saponification Value of Drying Oils, Fatty Acids, and Polymerized Fatty Acids
ASTM D1982 - Titer of Fatty Acids
ASTM E291 - Chemical Analysis of Caustic Soda and Caustic Potash (Sodium Hydroxide and Potassium Hydroxide)
ASTM F503 - Preparing Aircraft Cleaning Compounds, Liquid Type, for Storage Stability Testing

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 Material: Shall be composed of a mixture of a suitable solvent, potassium oleate, and inhibitors and coupling agents as required.

3.2 Composition:

Material	By Volume	By Weight
Orthodichlorobenzene, min		53%
Cresylic Acid (100% Acid Basis), min		23%
Potassium Oleate (Anhydrous Basis)		10 - 12%
Water, max	5%	
Inhibitors and Other Materials, max	5%	

3.3 Properties: The individual components and the product shall conform to the following requirements as specified; tests shall be performed on the components and product supplied and in accordance with specified test methods, insofar as practicable:

3.3.1 Orthodichlorobenzene: Shall be uniform in quality, free from contaminants, and shall conform to the following:

3.3.1.1	Distillation Range, 5 - 95% Point	175° - 184°C (347° - 363°F)	ASTM D1078
3.3.1.2	Specific Gravity, 25/25°C (77°/77°F), min	1.29	ASTM D891
3.3.1.3	Free Acid as HCl, max	0.01% by wt	ASTM D847
3.3.1.4	Flash Point, Closed Tester, min	68°C (155°F)	ASTM D93

3.3.2 Cresylic Acid: Shall be an isomeric mixture of cresols, free of suspended matter, not containing mercaptans and other odor producing substances in quantities which produce obnoxious odors under service conditions, and shall conform to the following:

3.3.2.1 Color: Shall be colorless to a brown-yellow or pink.

3.3.2.2 Distillation Range: ASTM D1078

Initial Point, min	180°C (350°F)
50% Point	200° - 220°C (392° - 428°F)
90% Point, max	230°C (446°F)

3.3.2.3 Assay: ASTM D453

Tar Acids by Weight, min	95%

3.3.3 Oleic Acid: Shall be a commercial grade of distilled red oil conforming to the following:

3.3.3.1	Acid Number, min	182	ASTM D460
3.3.3.2	Saponification Number	197 - 203	ASTM D1962
3.3.3.3	Iodine Number	80 - 93	ASTM D1959
3.3.3.4	Titer	6° - 10°C (43° - 50°F)	ASTM D1982
3.3.3.5	Rosin Content	None	ASTM D1240

3.3.4 Potassium Hydroxide: Shall be a commercial grade conforming to the following:

3.3.4.1	Potassium Hydroxide, min	83%	ASTM E291

3.3.4.2	Potassium Chloride, max	0.04%	ASTM E291
3.3.4.3	Iron as Fe, max	100 ppm	ASTM E291

3.3.5 Inhibitors and Coupling Agents: Composition and type are not restricted, except that they shall have a boiling point not lower than 150°C (300°F) at atmospheric pressure.

3.3.6 Product: The product, mixed according to the composition of 3.2, shall conform to the following requirements:

3.3.6.1 Specific Gravity: Shall be determined at 25°C (77°F) in accordance with ASTM D891 and reported. Values for specific gravity of production batches shall not vary more than ±0.03 from the specific gravity determined on the preproduction material as in 4.4.1.

3.3.6.2 Stock Loss: Test specimens of alloys or electrodeposits shall not incur stock loss exceeding 0.000025 in. (0.65 μm) per surface, and plasma coatings shall not incur thickness loss exceeding 0.0001 in. (2.5 μm) when tested in accordance with ARP 1755, Category 7.

3.3.6.3 Undissolved Materials: Shall be not more than 0.1% by volume, determined in accordance with ASTM D96.

3.3.6.4 Flash Point: Shall be not lower than 70°C (160°F), determined in accordance with ASTM D92.

3.3.6.5 Seal Formation: Cleaning compound shall form a distinct emulsion when mixed with water, displaying not less than 20 mL nor more than 50 mL of seal layer separation, determined in accordance with 4.5.1. The pH of the seal layer shall be not greater than 9.8.

3.3.6.6 Storage Life: Product stored at 25°C ± 5 (77°F ± 9) for one year shall show no evidence of deterioration and shall meet all other technical requirements of this specification, determined in accordance with ASTM F503.

3.4 Quality: The product, as received by purchaser, shall be uniform in quality and condition and shall be free from abrasive materials, rosin, and other contaminants detrimental to usage of the product.

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 4.6. 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:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.2), specific gravity (3.3.6.1), undissolved materials (3.3.6.3), and seal formation (3.3.6.5) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction 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 the product to a purchaser, when a change in materials or processing, or both, requires reapproval as in 4.4.2, and when purchaser deems conformatory testing to be required.

4.2.2.1 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: Sufficient compound shall be selected 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.

4.3.1 A lot shall be 3,000 gal (11,400 L) or less of product produced in a single production run from the same batches of raw materials and presented for vendor's inspection at one time. A lot may be packaged in smaller quantities and delivered under the basic lot approval provided lot identification is maintained.

4.3.2 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3 and the report of 4.6 shall state that such a plan was used.

4.4 Approval:

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

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production material which are essentially the same as those used on the approved sample material. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material or processing, or both, and, when requested, sample material. Production material made by the revised procedure shall not be shipped prior to receipt of reapproval.