The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3046D

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Superseding AMS 3046C

Submitted for recognition as an American National Standard

Magnetic Particles, Fluorescent
Wet Method, Oil Vehicle, Aerosol Packaged

NOTICE

This Reaffirmed specification was inadvertently Cancelled in May 1998 and is now being reinstated.

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1. SCOPE:

1.1 Form:

This specification covers one type of fluorescent magnetic particles in the form of a mixed, ready-to-use suspension in an odorless, inspection oil vehicle and packaged in aerosol cans.

1.2 Application:

Primarily as the inspection medium in a wet, fluorescent magnetic particle inspection system as defined in AMS 2640 or MIL-STD-1949.

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 documents shall be as specified in AMS 2350.

2.1 SAE Publications:

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

2.1.1 Aerospace Material Specifications:

AMS 2350	Standards and Test Methods
AMS 2640	Magnetic Particle Inspection
AMS 2641	Vehicle, Magnetic Particle Inspection, Petroleum Base
AMS 2820	Aerosol Packaging
AMS 2825	Material Safety Data Sheets
AMS 3044	Magnetic Particles, Fluorescent, Wet Method, Dry Powder

2.2 ASTM Publications:

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

ASTM D 96 Water and Sediment in Crude Oils

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
MIL-STD-1949 Inspection, Magnetic Particle

3. TECHNICAL REQUIREMENTS:

3.1 Material:

The product shall be composed of durable fluorescent magnetic particles, which have been dyed or otherwise treated to attain the color specified. The particles shall be supplied mixed in the proper proportion with an inspection vehicle and packaged in aerosol cans.

3.1.1 Fluorescent magnetic particles shall conform to AMS 3044.

3.1.2 Magnetic particle inspection vehicle shall conform to AMS 2641.

3.2 Storage Life:

The product shall meet the requirements of 3.3 when tested at any time up to 12 months from date of manufacture.

3.3 Properties:

The product shall conform to the following requirements; tests shall be performed on the product supplied in accordance with specified test methods, using a test suspension prepared by spraying the complete contents of several aerosol cans into a clean container to produce at least 1 quart (1 L) of suspension, agitating the aerosol cans frequently to exhaust all particulate material:

3.3.1 Contamination: The product shall show no evidence of foreign material, agglomeration, or scum, determined by visual examination of the test suspension at the following times:

3.3.1.1 During preparation of the test suspension as in 3.3.

3.3.1.2 After mixing the test suspension, allowing it to stand for not less than 30 minutes, and agitating it slightly.

3.3.1.3 During tests to determine other characteristics of the product.

3.3.2 Concentration: The concentration of fluorescent magnetic particles in the freshly-sprayed suspension shall be 0.15 - 0.30 mL of fluorescent magnetic particles in 100 mL of suspension, determined by mixing the test suspension thoroughly, filling a 100 mL calibrated centrifuge tube as specified in ASTM D 96, allowing it to stand undisturbed for a least 30 minutes, and reading, on the calibrated tube, the volume of the particles settled from the suspension.

3.3.3 Sensitivity:

3.3.3.1 Ring Test: The product shall show a five-hole indication on the ring test specimen defined in MIL-STD-1949, determined by placing the ring on a 1-inch (25-mm) diameter copper bar and circularly magnetizing the ring in a standard magnetic particle inspection unit by passing 2500 amperes of direct current through the bar immediately before flushing the ring with the agitated test suspension that has passed the contamination (3.3.1) and concentration (3.3.2) tests. Examine the ring in a darkened area where the white light does not exceed 2 foot-candles (20 lux). An ultraviolet (black) light shall be used at a measured intensity of not less than 1,000 uW/cm2 and a wave length of 320 - 400 nm filtered to peak at 365 nm to activate the fluorescent magnetic particles.

3.3.3.2 Flaw-to-Background Test: Obtain a test part, or prepare a test specimen, containing flaws of the size expected to be found in routine inspection. The surface finish of the test specimen shall be representative of production parts. Magnetize and flush the specimen as specified in 3.3.3.1, using a sample of agitated test suspension that has passed the contamination (3.3.1) and concentration (3.3.2) tests. View the flaw indications in a darkened area under ultraviolet light as defined in 3.3.3.1. Indications shall be sharp and distinct. Background fluorescence around the flaws shall be of a level which will neither obscure the flaw indications nor cause difficulty in flaw detection.

3.4 Aerosol Spray Cans:

The aerosol cans selected for test shall be maintained at room temperature for not less than 12 hours prior to testing. During testing, the aerosol can may be immersed in water at 77 °F ± 2 (25 °C ± 1) periodically to maintain the container and its contents at room temperature.

3.4.1 Sprayability and Leakage:

3.4.1.1 All aerosol pressure cans shall be equipped with a spray nozzle. The nozzle shall provide a fine, steady spray and shall deposit the product evenly on a flat or vertical surface. No chunks of solids shall be expelled and no clogging of the nozzle shall occur.

3.4.1.2 The characteristics of the spray pattern and the performance of the spray nozzle shall be evaluated by vigorously shaking the can for not less than 30 seconds with the contained pellet sounding on each shake and spraying a pattern on large sheets of newspaper or a similar surface to determine the coverage and evenness of the spray. After spraying several patterns, the nozzle shall be examined for evidence of chunks or solids and clogging. The can shall then be immersed for not less than 15 minutes in water at 126 - 129 °F (52 - 54 °F); there shall be no visible evidence of leakage from, or distortion of, the pressurized container. The pressurized can shall then be immersed in water at 77 °F ± 2 (25 °C ± 1) until the temperature has stabilized and, after vigorous shaking, two more patterns shall be sprayed. The spray characteristics shall have not changed and there shall be no chunking of particles or clogging of the nozzle.

3.4.1.2.1 CAUTION: DO NOT HEAT THE PRESSURIZED CAN OVER 129 °F (54 °C).

3.4.2 Complete Expulsion: The complete usable portion of the contents shall have been expelled before the propellant is expended. The expelled contents shall be not less than 5 fluid ounces (50 mL) and the particle content shall conform to the aerosol spray requirements. Vigorously shake for not less than 30 seconds each unused can to be tested, with the contained pellet sounding on each shake, and expel the contents in a series of short blasts into a clean glass container graduated in ounces (mL) in such a manner that the entire contents of the can will be retained in the glass container. The aerosol can may be immersed periodically in water at 77 °F ± 2 (25 °C ± 1) to maintain the can and its contents at room temperature. Repeat the vigorous shaking and short blasts until there is no further escape of gas.

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:

4.2.1 Acceptance Tests: Tests to determine conformance to all technical requirements of this specification, except storage life (3.2), 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 product to a purchaser, when a change in material and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory 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, contracting officer, or request for procurement.

4.3 Sampling:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient product shall be taken at random from each lot to perform all required test. 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.

4.3.1.1 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. A lot may be packaged in smaller quantities and delivered under the basic lot approval provided lot identification is maintained.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

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

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